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A. C. BOWDLER.

BRITISH
FRESHWATER ALGÆ.

VOL. II.

LONDON :
Printed by A. SPOTTISWOODE,
New-Street-Square.

A HISTORY
OF THE
BRITISH
FRESHWATER ALGÆ,

INCLUDING DESCRIPTIONS OF
THE DESMIDÆ AND DIATOMACEÆ.

WITH
UPWARDS OF ONE HUNDRED PLATES,
ILLUSTRATING THE VARIOUS SPECIES.

BY

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BOTANICAL SOCIETY ; AND CORRESPONDING MEMBER OF THE DUBLIN
NATURAL HISTORY SOCIETY.

IN TWO VOLUMES.

VOL. II.

LONDON :

S. HIGHLEY, 32. FLEET STREET ;

AND H. BAILLIERE, 219. REGENT STREET.

EDINBURGH : SUTHERLAND & KNOX, 58. PRINCE'S STREET.

PARIS : J. B. BAILLIERE. LEIPSIG : T. O. WEIGEL.

1845.

BRITISH FRESHWATER ALGÆ.

EXPLANATION OF THE PLATES.

PLATE I.

Fig. 1. *Confervaria rivularis*. Spores killed by opium (magnified 340 times). — Fig. 2. *Conf. glomerata*. Spores killed by iodine (magnified 500 times). Fig. 3. The same treated with iodine and dried between two plates of glass (magnified to the same extent). Fig. 4. The same beginning to germinate (430 times). Fig. 5. Germination more advanced (290 times). Fig. 6. Germination still more advanced. — Fig. 7. *Chaetophora*? Spores killed by iodine. (This and the following are magnified 340 times). Fig. 8. The same, treated with iodine. Fig. 9. Germination. — Fig. 10. *Chaetophora elegans var. pisiformis*. Spores killed by iodine. Fig. 11. Germination. — Fig. 12. *Prolifera rivularis*. Spores the ciliae of which are invisible by reason of the rapid movement. (This and the following figures are magnified 341 times.) Fig. 13. The same, killed with iodine. Fig. 14. The same, treated with iodine, and dried between two plates of glass. Fig. 15. Germination. Figs. 16, 17. Germination more advanced. — Fig. 18. *Prolifera Candolii*. Spores killed with weak iodine. Fig. 19. Germination.

PLATE II.

Shows the reproduction of *Vaucheria clavata*. Fig. 20. The extremity of one of the filaments previous to the condensation of the contained endochrome. Fig. 21. The same,

with the endochrome slightly condensed. Fig. 22. The extremity has become clavate, and the endochrome considerably condensed, though still continuous with that of the remainder of the filament. Fig. 23. A diaphragm is formed between the endochrome contained in the clavate extremity of the filament and that of the filament itself. Fig. 24. The spore is completely formed, and surrounded by a transparent border. Fig. 25. The spore is represented in the act of escaping from the ruptured extremity of the filaments. Fig. 26. The extremity of the filament subsequent to the escape of the spore. Fig. 27. Spore after its emission: it is enveloped in a granular episporule: the ciliae are invisible; the colourless extremity is always in advance. Fig. 28. The spore, the movements of which have become retarded. Fig. 29. A spore, the movements of which have been suddenly arrested in iodine water. The ciliae are distinguished on the margin short and fine, which are the organs of locomotion. Fig. 30. Spore treated with iodine and dried between two plates of glass; the ciliae have become much more clear, and appear longer by reason of the retraction of the episporule. Fig. 31. Spore preparing to germinate; it has become globular; the colourless portion is no longer to be distinguished, and the episporule has disappeared. Figs. 32, 33. Germination. The extremities of the newly formed filaments are colourless.

PLATE III.

Fig. 1. *Vaucheria geminata*. — Fig. 2. *Vaucheria racemosa*.

PLATE IV.

Fig. 1. *Vaucheria dichotoma*. — Fig. 2. *Vaucheria sessilis*. — Fig. 3. *Vaucheria Dillwynii*.

PLATE V.

Fig. 1. *Vaucheria hamata*. — Fig. 2. *Vaucheria terrestris*. — Fig. 3. *Vaucheria ovoides*.

PLATE VI.

Fig. 4. *Vaucheria ornithocephala*. — Fig. 5. *Vaucheria aversa*. — Fig. 6. *Vaucheria polysperma*. — Fig. 7. *Vaucheria repens*.

PLATE VII.

Figures of *Lemania torulosa* after Kützing. Fig. 1. Represents the external cellular character of the filaments. Fig. 2. Shows the internal, spherical, and loosely aggregated cells, with some of the articulated sporules resting upon them. Figs. 3, 4, and 5. Exhibit the arrangement of the beaded and articulated spores within the inflated portions of the filaments. Figs. 6 and 12. The branched spores separated from the filament. Fig. 7. The same more highly magnified. Figs. 8, 9, 10, and 11. Germinating spores.

PLATE VIII.

Figs. 1, 2. *Bangia fusco-purpurea*. The first figure represents the species in its young condition, in which the endochrome of the cells is homogeneous, and the second the species in its fully developed form ; the endochrome having become granular or parcelled out into zoospores. — Fig. 3. *Trentepohlia pulchella*. — Fig. 4. *Lyngbya prolifica*.

PLATE IX.

Figs. 1 and 2. *Chætophora endiævifolia*. The former in its natural size, the latter magnified. — Figs. 3 and 4. *Chætophora elegans*. — Figs. 5 and 6. *Chætophora pisiformis*. The latter figure copied from Berkeley, and exhibiting the very rare capsular fructification. — Figs. 7 and 8. *Chætophora tuberculosa*. The latter figure after Kützing, showing its capsular fructification.

PLATE X.

Fig. 3. *Draparnaldia elongata*. — Fig. 4. *Draparnaldia nana*.

PLATE XI.

Fig. 1. *Draparnaldia condensata*. — Fig. 2. *Draparnaldia tenuis*.

PLATE XII.

Fig. 1. *Draparnaldia plumosa*. — Fig. 2. *Draparnaldia repetita*.

PLATE XIII.

Fig. 1. *Draparnaldia glomerata*. — Fig. 2. *Chætophora dilatata*. — Fig. 3. *Batrachospermum bombusinum*.

PLATE XIV.

Fig. 1. *Batrachospermum pulcherrimum*. — Figs. 2 and 3. *Batrachospermum alpestre*.

PLATE XV.

Fig. 1. *Batrachospermum confusum*. — Figs. 2 and 3. *Batrachospermum rubrum*.

PLATE XVI.

Figs. 1 and 2. *Batrachospermum atrum*. — Figs. 3 and 4. *Thorea ramosissima*. The latter copied from Kützing, and showing its capsular fructification.

PLATE XVII.

Fig. 1. A cell of *Zygnema nitidum*, showing the curiously constructed central organ with its radii; the cruciform raphide-like bodies, and the curved strings of the cytoplasm. Figs. 2 and 3. The same, exhibiting the appearance of the central organ subsequent to the removal of the radii. — Figs. 4 and 5. Filaments of a non-conjugating *Zygnema* showing the inverted structure of the cells in certain species of the genus. — Fig. 6. Portion of *Cladophora crispata*, showing the vascular network which connects the zoospores in the early period of their formation. Figs. 7 and 8. Exhibit the ringed apparatus, with which the reproductive cells in the genus *Vesiculifera* are furnished; as also the sporangia and the vascular network.

PLATE XVIII.

Figs. 1 and 2. *Zygnema serratum*. The former representing the filaments in its young condition, and showing the spiral disposition of the endochrome; and the latter, the mode of conjugation of the filaments and the sporangia.

PLATE XIX.

Figs. 1 and 2. The same conditions of *Zygnema orbicularare*.

PLATE XX.

Zygnema alternatum in a state of conjugation.

PLATE XXI.

Zygnema interruptum in a similar condition.

PLATE XXII.

Figs. 1 and 2. Free and conjugated states of *Zygnema nitidum*.

PLATE XXIII.

Figs. 1 and 2. *Zygnema neglectum*. — Figs. 3 and 4. *Zygnema deciminum*.

PLATE XXIV.

Figs. 1 and 2. Free and conjugated states of *Zygnema belle*.

PLATE XXV.

Figs. 1 and 2. The same conditions of *Zygnema pellucidum*.

PLATE XXVI.

Figs. 1 and 2. Conjugated states of *Zygnema curvatum*.

PLATE XXVII.

Zygnema rivulare.

PLATE XXVIII.

Figs. 1 and 2. *Zygnema quininum*. — Figs. 3 and 4. *Zygnema aestivum*. — Figs. 5 and 6. *Zygnema commune*.

PLATE XXIX.

Zygnema varians.

PLATE XXX.

Figs. 1 and 2. *Zygnema malformatum*. — Figs. 3 and 4. *Zygnema cateniforme*. — Figs. 5 and 6. *Zygnema gracile*. — Figs. 7 and 8. *Zygnema parvum*. — Figs. 9 and 10. *Zygnema flavescentia*.

PLATE XXXI.

Figs. 1 and 2. *Zygnema Grevilleanum*. — Figs. 3 and 4. *Zygnema longatum*.

PLATE XXXII.

Figs. 1 and 2. *Zygnema inequale*. — Figs. 3 and 4. *Zygnema subventricosum*. — Fig. 5. *Zygnema subventricosum* var. — Figs. 6 and 7. *Zygnema inflatum*. — Fig. 8. *Zygnema inflatum* var. — Figs. 9 and 10. *Zygnema tenuissimum*.

PLATE XXXIII.

Fig. 1. *Zygnema rostratum*. — Fig. 2. *Zygnema Woodsii*. — Fig. 3. *Zygnema reversum*.

PLATE XXXIV.

Figs. 1, 2, 3. *Zygnema angulare*. — Fig. 4. *Zygnema abbreviatum*. — Fig. 5. *Zygnema malleola*. — Fig. 6. *Zygnema affine*.

PLATE XXXV.

Zygnema mirabile.

PLATE XXXVI.

Zygnema Hassallii.

PLATE XXXVII.

Figs. 1 and 2. *Zygnema quadratum*. — Fig. 3. *Zygnema intermedium*. — Fig. 4. *Zygnema diductum*. — Fig. 5. *Zygnema resicatum*. — Fig. 6 and 9. *Zygnema Jenneri*. — Fig. 7. *Zygnema dubium*. — Fig. 8. *Zygnema minimum*.

PLATE XXXVIII,

Fig. 1. *Tyndaridea cruciata*. — Figs. 2 and 3. *Tyndaridea anomala*. — Fig. 4. *Tyndaridea lutescens*. — Fig. 5. *Tyndaridea bicornis*. — Figs. 6 and 7. *Tyndaridea insignis*. — Fig. 8. *Tyndaridea ovalis*. — Fig. 10. *Tyndaridea stagnalis*. — Fig. 9. *Tyndaridea stagnalis* var.?

PLATE XXXIX.

Figs. 1 and 2. *Tyndaridea conspicua*. — Fig. 3. *Tyndaridea immersa*. — Figs. 4 and 5. *Tyndaridea Ralfsii*. — Fig. 6. *Tyndaridea decussata*.

PLATE XL.

Fig. 1. *Mougeotia major*. — Fig. 2. *Mougeotia genuflexa*.

PLATE XLI.

Fig. 1. *Zygogonium ericetorum* in its terrestrial condition. — Fig. 2. Aquatic form of the same.

PLATE XLII.

Fig. 1. *Mesocarpus scalaris*. — Fig. 2. *Mesocarpus scalaris* var.

PLATE XLIII.

Fig. 1. *Mesocarpus intricatus*. — Fig. 2. *Mesocarpus recurvus*.

PLATE XLIV.

Fig. 1. *Mesocarpus depressus*. — Fig. 2. *Mesocarpus ovalis*.

PLATE XLV.

Fig. 1. *Mesocarpus nummuloides*. — Fig. 2. *Mesocarpus parvulus*. — Fig. 3. *Mesocarpus parvulus* var. — Fig. 4. *Mesocarpus angustus*.

PLATE XLVI.

Figs. 1, 2. *Mesocarpus notabilis*.

PLATE XLVII.

Fig. 1. *Staurocarpus glutinosus*. — Fig. 2. *Staurocarpus cærulescens*.

PLATE XLVIII.

Fig. 1. *Staurocarpus quadratus*. — Fig. 2. *Staurocarpus virescens*.

PLATE XLIX.

Fig. 1. *Staurocarpus gracilis*. — Fig. 2. *Staurocarpus gracillimus*.

PLATE L.

Figs. 1, 2. *Vesiculifera capillaris*. — Fig. 3. *Vesiculifera pulchella*. — Fig. 4. *Vesiculifera Vaucherii*. — Fig. 5. *Vesiculifera virescens*. — Fig. 6. *Vesiculifera ovata*. — Fig. 7. *Vesiculifera dissiliens*. — Fig. 8. *Vesiculifera Ralfsii*.

PLATE LI.

Fig. 1. *Vesiculifera crassa*. — Fig. 2. *Vesiculifera Landsboroughi*. — Fig. 3. *Vesiculifera concatenata*. — Fig. 4. *Vesiculifera cardiaca*.

PLATE LII.

Fig. 1. *Vesiculifera lacustris*. — Fig. 2. *Vesiculifera ciliata*. — Figs. 3, 4, 5. *Vesiculifera Boscii*. — Fig. 6. *Vesiculifera paludosa*. — Fig. 7. *Vesiculifera Borissii*. — Fig. 8. *Vesiculifera crispa*. — Fig. 9. *Vesiculifera Candolii*.

PLATE LIII.

Fig. 1. *Vesiculifera affinis*. — Fig. 2. *Vesiculifera inequalis*. — Fig. 3. *Vesiculifera aequalis*. — Fig. 4. *Vesiculifera compressa*. — Fig. 5. *Vesiculifera spherica*. — Fig. 6. *Vesiculifera fasciata*. — Fig. 7. *Vesiculifera Rothii*. — Fig. 8. *Vesiculifera alata*. — Fig. 9. *Vesiculifera flavesrens*. — Fig. 10. *Vesiculifera Müllerii*. — Figs. 11, 12. *Vesiculifera hexagona*. — Fig. 13. *Vesiculifera*. — Fig. 14. *Vesiculifera dubia*.

PLATE LIV.

Fig. 1. *Bulbochæte setigera* in its ordinary condition. Figs. 2, 3, and 4. States of the same.

PLATE LV.

Cladophora crispata.

PLATE LVI.

Fig. 1. *Cladophora glomerata*. The species not magnified. Fig. 2. The same magnified.

PLATE LVII.

Cladophora glomerata var. *ægagropila*.

PLATE LVIII.

Hydrodictyon utriculatum.

PLATE LIX.

Figs. 4, 5, 6. *Lyngbya zonata* in its ordinary form. — Figs. 1, 2, 3. *Lyngbya zonata* var. — Fig. 7. *Lyngbya muralis*.

PLATE LX.

Figs. 1, 2. *Lyngbya floccosa*. — Fig. 3. *Lyngbya virescens*. — Fig. 4. *Lyngbya punctalis*. — Fig. 5. *Lyngbya vermicularis*.

PLATE LXI.

Fig. 1. A portion of *Chara vulgaris* : a, b, c, d, e, f, g, h, indicate the cells in which a circulation somewhat different from that of the ordinary cells is manifest, the current taking a circular instead of its usual spiral course. Fig. 2. One of the sprouts more highly magnified, the arrows indicating the courses of the molecules. Fig. 3. shows the root cells, the currents in these agreeing with those of the stems, due allowance being made for the difference in the direction of their growth. Fig. 4. In fig. 4. the globule is represented in profile with the stalk on which it grows; also the nucule surrounded by its sprouts. Fig. 5. is a view on a large scale of the stalk with a part of the outside or transparent portion of the globule attached to it. Fig. 6. is a cross section of the stalk only, the whole of which is one cell. i, in figs. 5 and 6, indicates the mass which circulates round the cells.—Fig. 7. A portion of a cell of *Chara vulgaris* magnified, j j the internal membrane in its two strips; k k and l l on the tubes, the lines to which their edges adhered: these lines are indents on the outside and ridges within, as shown in the section.—Figs. 8 and 9. A portion of a cell of *Nitella* with the tender green tissue floated out. Figs. 10 and 11. show portions of the denser fluid detached, and forming large spherical balls.

This Plate is copied from Varley.

PLATE LXII.

Figs. 1 and 2. The segments forming the outer coating of the globule magnified. Fig. 3. The filaments contained within the globule. Fig. 4. The same more highly magnified, showing the divisions into which each thread is divided, and also the outlines of the animalcules contained singly in each cell. Figs. 5 and 6. The animalcules more highly magnified displaying the cilia by which their active movements are effected. Figs. 7 and 8. Two of the peculiar cells with the enclosed lateral circulating vesicle.

The figures contained in this plate are taken for the most part from those illustrating M. G. Thuret's paper on the animalecules contained in the anther of *Chara*.

PLATE LXIII.

Fig. 1. *Batrachospermum proliferum*. — Fig. 2. *Batrachospermum vagum*.

PLATE LXIV.

Figs. 1 and 4. *Raphidia angulosa*. — Figs. 2 and 3. *Raphidia viridis*.

PLATE LXV.

Figs. 1 and 4. *Rivularia granulifera*. — Fig. 2. *Lithonema calcareum*. — Fig. 3. *Lithonema crustaceum*. — Figs. 5 and 6. *Oscillatoria lucifuga*.

PLATE LXVI.

Fig. 1. *Stigonema atrovirens*. — Figs. 2 and 3. *Stigonema mammulosum*. — Figs. 4 and 5. *Stigonema panniforme*.

PLATE LXVII.

Figs. 1 and 2. *Hassallia ocellata*. — Figs. 3 and 4. *Stigonema minutum*. — Fig. 5. *Hassallia? byssoidea*. — Fig. 6. *Hassallia? limbata*.

PLATE LXVIII.

Fig. 1. *Scytonema Hibernicum*. — Fig. 2. *Scytonema myochrous*. — Fig. 3. *Hassallia compacta*. — Figs. 4, 5. *Tolypothrix? Dillwynii*. — Fig. 6. *Petalonema alatum*. — Fig. 7. *Arthronema cirrhosum*.

PLATE LXIX.

Fig. 1. *Calothrix mirabilis*. — Fig. 2. *Stigonema interruptum*. — Fig. 3. *Tolypothrix punctata*. — Fig. 4. *Tolypothrix distorta*. — Fig. 5. *Tolypothrix Berkeleyana?* — Fig. 6. *Tolypothrix nivea*. — Fig. 7. *Tolypothrix rufescens*.

PLATE LXX.

Fig. 1. *Microcoleus repens*. — Fig. 2. *Microcoleus gracilis*. — Fig. 3. *Microcoleus anguiformis*. — Fig. 4. *Oscillatoria cinerea*. — Fig. 5. *Oscillatoria pulchella*.

PLATE LXXI.

Fig. 1. *Oscillatoria mucosa*. — Fig. 2. *Oscillatoria limosa*. — Fig. 3. *Oscillatoria nigra*. — Figs. 4. 6. and 7. *Oscillatoria contexta*. — Fig. 8. *Oscillatoria Carmichaeli*. — Fig. 5. *Oscillatoria spadicea*. — Fig. 9. *Oscillatoria virescens*. — Fig. 10. *Oscillatoria decorticans* β *corticola*.

PLATE LXXII.

Fig. 1. *Oscillatoria tenuis*. — Fig. 2. *Oscillatoria aerugescens*. — Fig. 3. *Oscillatoria thermalis*. — Fig. 4. *Oscillatoria terebriformis*. — Fig. 5. *Oscillatoria spadicea*. — Fig. 6. *Oscillatoria turfosa*. — Fig. 7. *Oscillatoria autumnalis*. — Fig. 8. *Oscillatoria splendida*. — Fig. 9. *Oscillatoria subfuscata*. — Fig. 10. *Oscillatoria violacea*. — Fig. 11. *Oscillatoria rupestris*. — Fig. 12. *Oscillatoria muscorum*. — Fig. 13. *Oscillatoria Dickiei*. — Fig. 14. *Lyngbya copulata*.

PLATE LXXIII.

Fig. 1. *Nostoc macrosporum*. — Fig. 2. Filaments of the same dividing themselves into separate portions, each of which forms a distinct individual.

PLATE LXXIV.

Fig. 1. *Nostoc cæruleum*. — Fig. 2. *Nostoc commune*. — Fig. 3. *Nostoc* ? *variegatum*. — Fig. 4. *Nostoc muscorum*.

PLATE LXXV.

Fig. 1. *Trichormus incurvus* ? — Fig. 2. *Anabaina flos-aquæ*. — Fig. 3. *Anabaina impalpebralis* ? — Fig. 4. *Anabaina licheniformis* ? — Fig. 5. *Spirillum Jenneri*. — Fig. 6. *Spirillum rupestre*. — Fig. 7. *Spirillum Thompsoni*. — Fig. 8.

Spirillum miutissimum. — Fig. 9. *Anabaina constricta*. — Fig. 10. *Nostoc cæruleum*. — Fig. 11. *Monormia intricata*.

PLATE LXXVI.

Fig. 1. *Nostoc verrucosum*. — Fig. 2. *Nostoc foliaceum*. — Figs. 3 and 4. *Nostoc pruiniforme*. — Fig. 5. *Nostoc sphæricum*. — Fig. 6. *Aphanizomenon incurvum*. — Fig. 7. *Coccochloris protuberans*. — Fig. 8. *Hæmatococcus microsporus*. — Fig. 9. *Hæmatococcus minutissimus*, in part. — Fig. 10. *Hæmatococcus arenarius*. — Fig. 11. *Nostoc cæruleum*, natural size. Fig. 12. *Nostoc verrucosum*? in young condition.

PLATE LXXVII.

Fig. 1. *Ulva calophylla*. — Fig. 2. (a) *Enteromorpha intestinalis*. (b) Transverse section of one of the filaments. — Fig. 3. *Hydrurus Ducluzelii*. — Fig. 4. *Ulva translucens*. — Fig. 5. *Botrydium granulatum*. — Fig. 6. *Coleochæte scutata*.

PLATE LXXVIII.

Fig. 1. (a) *Coccochloris Mooreana* of natural size. (b) Portion of the same magnified. — Fig. 2. (a) (b) *Coccochloris hyalina*. — Fig. 3. (a)(b) *Coccochloris muscorum*. — Fig. 4. (a) (b) *Coccochloris depressa*. — Fig. 5. (a) (b) *Coccochloris hyalina*? — Fig. 6. (a)(b) *Coccochloris rivularis*. — Fig. 7. (a) *Coccochloris Grevillei*. (b) Variety of the same. Fig. 8. Variety β magnified. — Fig. 8. (a) *Sorospora virescens*. — Fig. 9. *Hæmatococcus theriacus*. — Fig. 10. *Tetraspora lubrica*. — Fig. 11. *Tetraspora flava*. — Fig. 12. *Ulva crispa*. — Fig. 13. *Ulva bullosa*.

PLATE LXXIX.

Fig. 1. *Sorospora montana*. — Fig. 2. *Hæmatococcus sanguineus*. — Fig. 3. *Sorospora Ralfsii*.

PLATE LXXX.

Fig. 1. *Hæmatococcus cryptophylla*. — Fig. 2. *Protococcus nivalis*. — Fig. 3. *Hæmatococcus Allmanni*. — Fig. 4. *Hæmatococcus Hookeriana*. — Fig. 5. *Palmella cruenta*. — Fig. 6. (a) (b) *Hæmatococcus insignis*. — Fig. 7. *Sorospora? grumosa*.

PLATE LXXXI.

Fig. 1. *Hæmatococcus frustulosus*. — Fig. 2. *Botrydina vulgaris*. — Fig. 3. *Hæmatococcus alpestris*. — Fig. 4. *Hæmatococcus murorum*. — Fig. 5. *Hæmatococcus vulgaris*. — Fig. 6. *Hæmatococcus granosus*.

PLATE LXXXII.

Fig. 1. *Hæmatococcus rupestris*. — Fig. 2. *Hæmatococcus binalis*. — Fig. 3. *Hæmatococcus æruginosus*. — Fig. 4. *Hæmatococcus furfuraceus*. — Fig. 5. *Hæmatococcus lividus*. — Fig. 6. *Coccochloris protuberans* of the natural size. Figs. 7, 8, 9, 10. The same magnified in different degrees.

PLATE LXXXIII.

Fig. 1. *Desmidium cylindricum*. Fig. 2. End view of a cell of the same. — Fig. 3. *Glæoprium dissiliens*. Fig. 4. End view of a cell of the same. — Fig. 5. *Glæoprium mucosum*. Fig. 6. End view of a cell of the same. — Fig. 7. *Desmidium Swartzii*. Fig. 8. End view of a cell of the same. — Fig. 9. *Desmidium Borreri*. Fig. 10. End view of the same. — Figs. 11 and 12. *Sphærozosma elegans*. (Very bad.)

PLATE LXXXIV.

Fig. 3. *Desmidium quadrangulatum*: a, front view; b, end view; c, two frustules of *D. Swartzii* for comparison. — Fig. 1. *Sphærozosma elegans*. — Fig. 2. *Sphærozosma excavatum*. — Fig. 4. *Closterium Lunula*. — Fig. 5. *Closterium Diana*. — Fig. 6. *Merismopedia punctata*. — Fig. 7. *Trigonocystis orbicularis*: a, front view; b, end view;

c, showing the mode of formation of new segments.—Fig. 8. *Trigonocystis mucronata*: *a*, front view of different forms of the species; *b*, end view; *c*, conjugated fronds with the sporangium; *d*, state of the sporangium.—Fig. 9. *Trigonocystis muricata*: *a*, front view; *b*, end view; *c*, empty frond.—Fig. 10. *Trigonocystis muricata* var. *rugosa*: *a*, front view; *b*, end view.—Fig. 11. *Trigonocystis tricornis*: *a*, front view; *b*, end view; *c*, end view of empty frond.—Fig. 12. *Trigonocystis aculeata*: *a*, front view; *b*, end view; *c*, end view of variety.

PLATE LXXXV.

Fig. 1. *Trigonocystis gracilis*: *a*, front view; *b*, *c*, end views.—Fig. 2. *Trigonocystis bifida*: *a*, *a*, front views; *b*, end view; *c*, formation of new fronds.—Fig. 3. *Staurastrum paradoxum*: *a*, front view; *b*, end view; *c*, new segment.—Fig. 4. *Staurastrum?* *tetraceum*: *a*, front view; *b*, end view; *c*, side view.—Fig. 5. *Staurastrum dilatatum*: *a*, front view; *b*, end view.—Fig. 6. *Pentasterias Jenneri*; *a*, front view; *b*, end view; *c*, empty segment.—Fig. 7. *Pentasterias margaritaceum*: *a*, front view; *b*, *b*, end views.—Fig. 8. *Pentasterias arachne*: *a*, front view; *b*, end view.—Fig. 9. *Arthrodesmus convergens*: *a*, front view; *b*, end view.—Fig. 10. *Arthrodesmus incus*: *a*, front view; *b*, end view.—Fig. 11. *Arthrodesmus octocornis*: *a*, front view; *b*, end view.

PLATE LXXXVI.

Fig. 1. *Cosmarium margaritiferum*.—Fig. 2. *Cosmarium Botrytis*.—Fig. 3. *Cosmarium ornatum*.—Fig. 4. *Cosmarium cylindricum*.—Fig. 5. *Cosmarium orbiculatum*.—Fig. 6. *Cosmarium crenatum*.—Fig. 7. *Cosmarium Cucurbita*.—Figs. 8 and 9. *Cosmarium ovale*.—Fig. 10. *Cosmarium Cucumis*.—Fig. 11. *Cosmarium quadratum*.—Fig. 12. *Cosmarium quadratum*, var.—Fig. 13. *Pediastrum Boryanum*.—Fig. 14. *Pediastrum angulosum*.—Figs. 15 and 16. *Pediastrum constrictum*.—Fig. 17. *Pediastrum tetras*.—

Fig. 18. *Pediastrum simplex*. — Fig. 19. *Pediastrum elegans*.

PLATE LXXXVII.

Fig. 1. *Closterium Ehrenbergii*. — Fig. 2. *Closterium moniliforme*. — Fig. 3. *Closterium turgidum*. — Fig. 4. *Closterium striolatum*. — Fig. 5. *Closterium acerosum*. — Fig. 6. *Closterium rostratum*. — Fig. 7. *Closterium setaceum*.

PLATE LXXXVIII.

Fig. 1. *Closterium lineatum*. — Fig. 2. *Closterium Cornu*. — Fig. 3. *Closterium Trabecula*. — Fig. 4. *Closterium Digtus*. — Fig. 5. *Closterium margaritaceum*.

PLATE LXXXIX.

Fig. 1. *Xanthidium furcatum*. — Fig. 2. *Xanthidium fasciculatum*? — Fig. 3. *Xanthidium aculeatum*: a, front view; b, end view; c, side view; d, new segment. — Fig. 4. *Xanthidium polygonum*. — Fig. 6. *Tetmemorus granulatus*: a, front view; b, side view; c, empty frond; d, fronds conjugated, showing mode of formation of the sporangium; e, sporangium perfectly formed. — Fig. 5. *Tetmemorus Brebissoni*: a, front view; b, side view; c, empty frond; d, segment of frond.

PLATE XC.

Fig. 1. *Micrasterias rotata*: a, adult frond; b, c, young fronds of same; d, showing the mode of formation of the new segment. — Fig. 2. *Micrasterias radiata*. — Fig. 3. *Holocystis oscitans*? (*Euastrum crux melitensis*, young, Ehr.) — Fig. 4. *Holocystis oscitans*. — Fig. 5. *Euastrum circulare*. — Fig. 6. *Euastrum*. — Fig. 7. *Micrasterias crux melitensis* (*Euastrum crux melitensis* Ehr.). — Fig. 8. *Euastrum Delta*: a, front; b, side view. — Fig. 9. *Euastrum affine*: a, front; b, side view. — Fig. 10. *Euastrum*.

PLATE XCII.

Fig. 1. *Euastrum oblongum*: *a*, front; *b*, side views; *c*, empty frond. — Fig. 2. *Euastrum insigne*. — Fig. 3. *Euastrum Pelta*: *a*, front; *b*, side view; *c*, empty frond. — Fig. 4. *Euastrum binale*. — Fig. 5. Variety of same. — Fig. 6. *Euastrum gemmatum*: *a*, front view; *b*, side ditto; *c*, *d*, end view; *e*, variety. — Fig. 7. *Euastrum verrucosum*: *a*, front view of young frond; *b*, ditto of adult frond; *c*, side view; *d*, end view. — Fig. 8. *Euastrum rostratum*. — Fig. 9. *Euastrum spinosum*: *a*, *b*, *d*, *e*, *f*, front view, and showing the mode of formation of new fronds; *c*, end view. — Fig. 10. *Euastrum*. — Fig. 11. *Euastrum Dilecta*: *a*, front view; *b*, transverse; *c*, *d*, end views.

PLATE XCII.

Fig. 1. *Pediastrum tricyclium*. — Fig. 2. *Pediastrum ellipticum*. — Fig. 3. *Pediastrum lunare*. — Fig. 4. *Pediastrum cribiforme*. — Fig. 5. *Pediastrum hexactis*. — Fig. 6. *Pediastrum excavatum*. — Fig. 7. *Pediastrum Rotula*. — Fig. 8. *Pediastrum incisum*. — Fig. 9. *Pediastrum heptactis*. — Fig. 10. *Pediastrum Napoleonis*. — Fig. 11. *Pediastrum Napoleonis* var. — Fig. 12. *Scenedesmus quadricaudatus*: *a*, frond in its ordinary state; *b*, var. with three spines; *c*, var. destitute of spines. — Fig. 13. *Scenedesmus dimorphus*. — Fig. 14. *Scenedesmus acutus*. — Fig. 15. *Scenedesmus triseriatus*. — Fig. 16. *Scenedesmus obtusus*. — Fig. 17. *Cylindrocystis Brebissoni*.

PLATE XCIII.

Fig. 1. *Sphaerophora globulifera*. — Fig. 2. A portion of a filament of *Meloseira arenosa*. — Fig. 3. End view of a frustule of the same. — Figs. 4 and 5. *Meloseira varians*. — Figs. 6 and 7. *Meloseira orichalcea*. — Figs. 8 and 9. *Tetracyclus lacustris*. — Fig. 10. *Bacillaria paradoxa*.

PLATE XCIV.

Fig. 1. *Diatoma vulgare*. — Fig. 2. The same as in a more advanced stage of its development. — Fig. 3. *Diatoma*

elongatum, at the period of its perfect developement. Fig. 4. The same in a younger condition. Fig. 6. The same with the frustules thrown back. Fig. 5. The same, var. *cuneatum*.—Figs. 7 and 8. States of *Diatoma virescens*? — Fig. 9. *Tabellaria flocculosum*, in an early period of its growth. Fig. 10. The same in a more advanced period of its developement.

PLATE XCV.

Fig. 1. *Fragilaria pectinalis*, showing the striæ on the anterior surface of the frustules. Fig. 2. The same. Fig. 3. Showing the oblique division of the frustules which occasionally takes place. Fig. 4. An interesting condition of the same: *a a*, end view of frustules of the species in its ordinary state; *b*, the same of frustules of the variety β *undulata*.—Fig. 5. Filaments of *Fragilaria hyemalis*: *a*, front view; *b*, end view of frustules of the same.—Fig. 6. *Fragilaria rhabdosoma*: *a*, front view; *b*, end view.—Figs. 7 and 8. Successive stages of the developement of *Diatoma virescens*: *a a a*, front views; *b b*, end views of frustules of the same.

PLATE XCVI.

Figs. 1 to 4. Portions of *Meridion circulare* of different ages. Fig. 5. Frustules of a condition of the same. Fig. 6.: *a a*, front view of two frustules of the same: *b b*, side view of the same.—Figs. 7 and 8. Fronds of *Meridion constrictum*. Fig. 9.: *a c*, front view of two frustules of the same: *b d*, end view of the same.—Fig. 10. *Tabellaria fenestratum*: *a*, front view; *b*, end view of a frustule of the same.—Fig. 11. *Tabellaria flocculosum* in the most advanced stage of its developement: *a* front view; *b*, end view of a frustule of the same.

PLATE XCVII.

Fig. 1. *Exilaria capitata*.—Fig. 2. *Exilaria Ulna*.—Fig. 3. *Exilaria fasciculata*.—Fig. 4. *Exilaria lunaris*.—Fig. 5.

Eunotia areus : *a*, front view ; *b*, side view. — Fig. 6.
Eunotia diodon : *a*, front view ; *b*, side view. — Fig. 7.
Eunotia triodon : *a*, front view ; *b*, side view. — Fig. 8.
Eunotia tetraodon : *a*, front view ; *b*, side view ; *c*, oblique view.

PLATE XCVIII.

Fig. 1. *Gomphonema geminatum*. — Fig. 2. *Gomphonema truneatum*.

PLATE XCIX.

Fig. 1. *Gomphonema acuminatum*. — Fig. 2. *Gomphonema dichotomum*.

PLATE C.

Fig. 1. *Gomphonema cristatum*. — Fig. 2. *Gomphonema Berkeleyi*. — Fig. 3. *Gomphonema minutissimum*. — Fig. 4. *Aehnanthes minutissima*. — Fig. 5. *Aehnanthes exilis*? — Fig. 6. *Cymbella Arcus* : *a*, front view ; *b*, side view. — Fig. 7. *Cymbella turgida* : *a*, *a*, front view ; *b*, side view. — Fig. 8. *Cymbella zebra* : *a*, front view ; *b*, side view. — Fig. 9. *Podosphenia*? *ocellatum*. — Fig. 10. *Encyonema prostratum*.

PLATE CI.

Fig. 1. *Cocconema lanceolatum*. — Fig. 2. *Cocconema cymbiforme*. — Fig. 3. *Cocconema Cistula*. — Fig. 4. *Cocconema ventricosum*.

PLATE CII.

Fig. 1. *Surirella biseriata* : *a*, front view ; *b*, side view. — Fig. 2. : *a*, *b*, *c*. *Frustulia viridis*. — Fig. 3. *Sphinctoeystis librilis* : *a*, front view ; *b*, side view. — Fig. 4. *Navicula*? *gibba*. — Fig. 5. *Navicula amphisbæna* : *a*, front view ; *b*, side view. — Fig. 6. *Navicula platystoma*. — Fig. 7. *Navicula*? *nodosa*. — Fig. 8. *Aulacocystis pellucida*. — Fig. 9. *Navicula phœnicenteron*. — Fig. 10. *Navicula Palea*. —

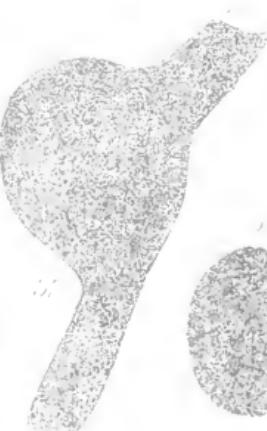
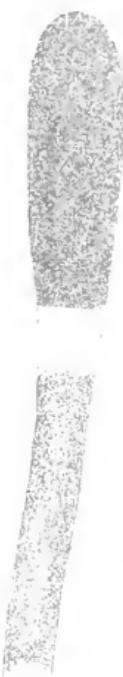
Fig. 11. *Gyrosigma Hippocampa*: *a*, front view; *b*, side view.—Fig. 12. *Nitzschia elongata*: *a*, front view; *b*, side view.—Fig. 13. *Navicula inequalis*.—Fig. 14. *Navicula lanceolata*.—Fig. 15. *Surirella Jenneri*: *a*, front view; *b*, end view.—Fig. 16. *Navicula*.

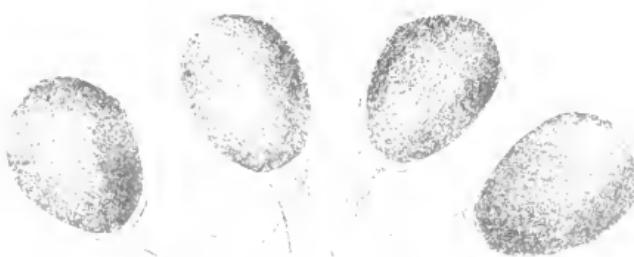
PLATE CIII.

Figs. 1 and 2. *Zygnema insigne*.—Fig. 3. *Coccochloris cystifera*.—Fig. 4. *Coccochloris variabilis*.—Fig. 5. *Coccochloris obscura*.



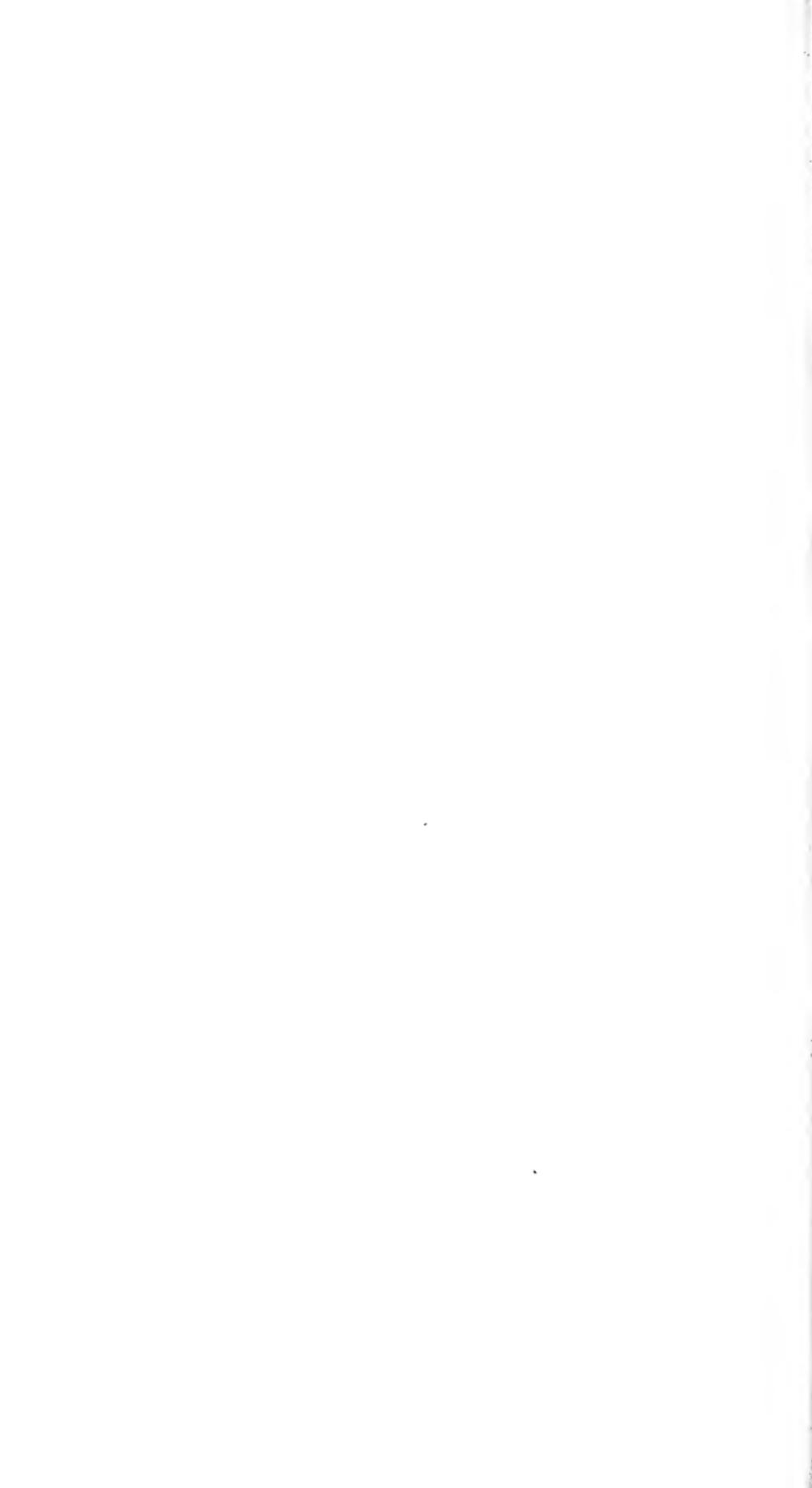














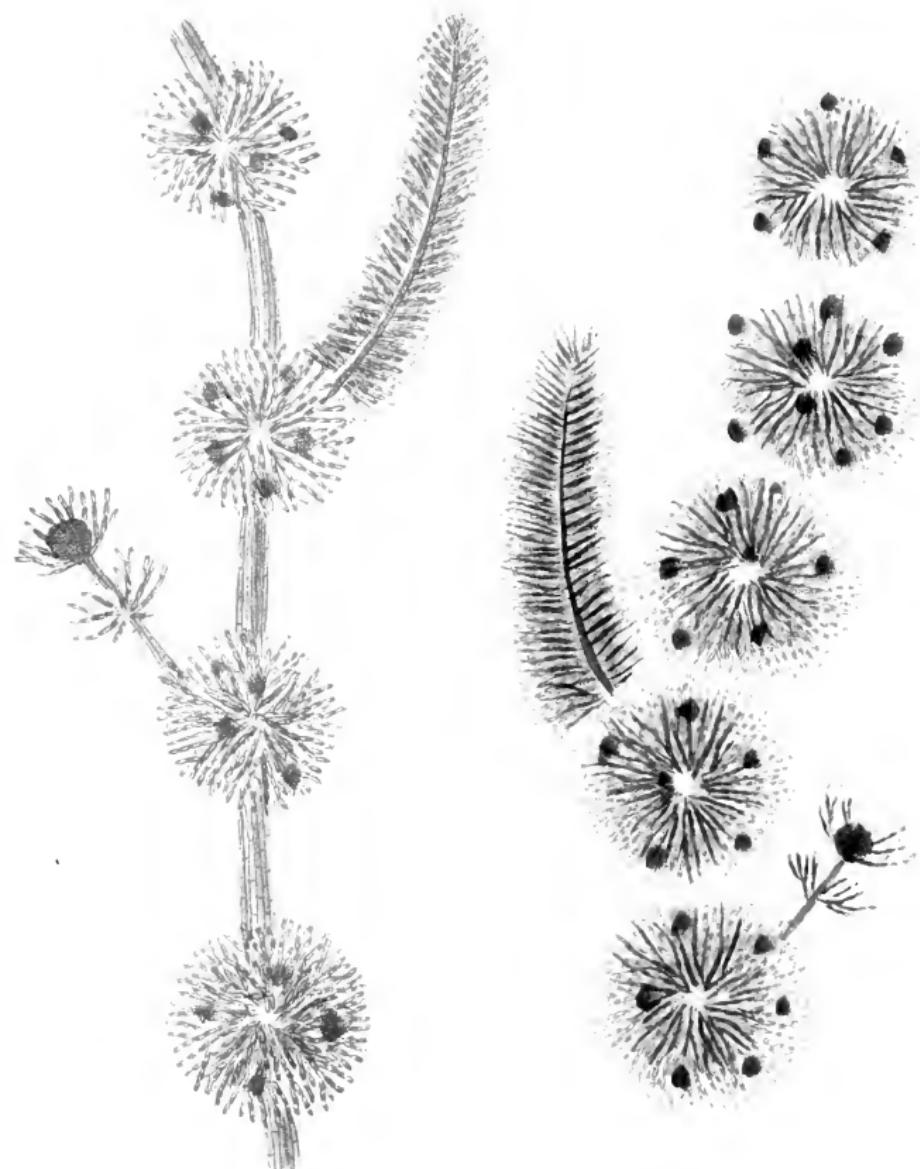








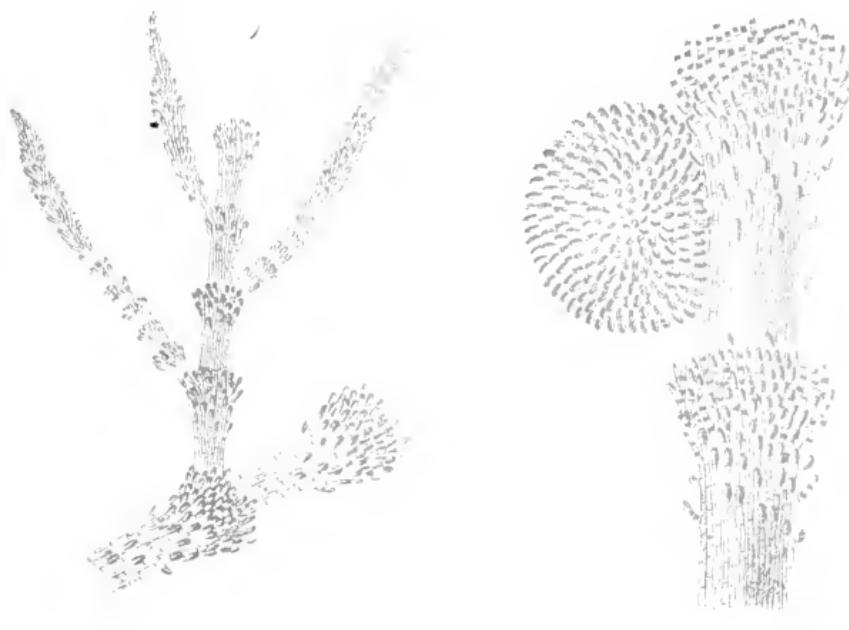


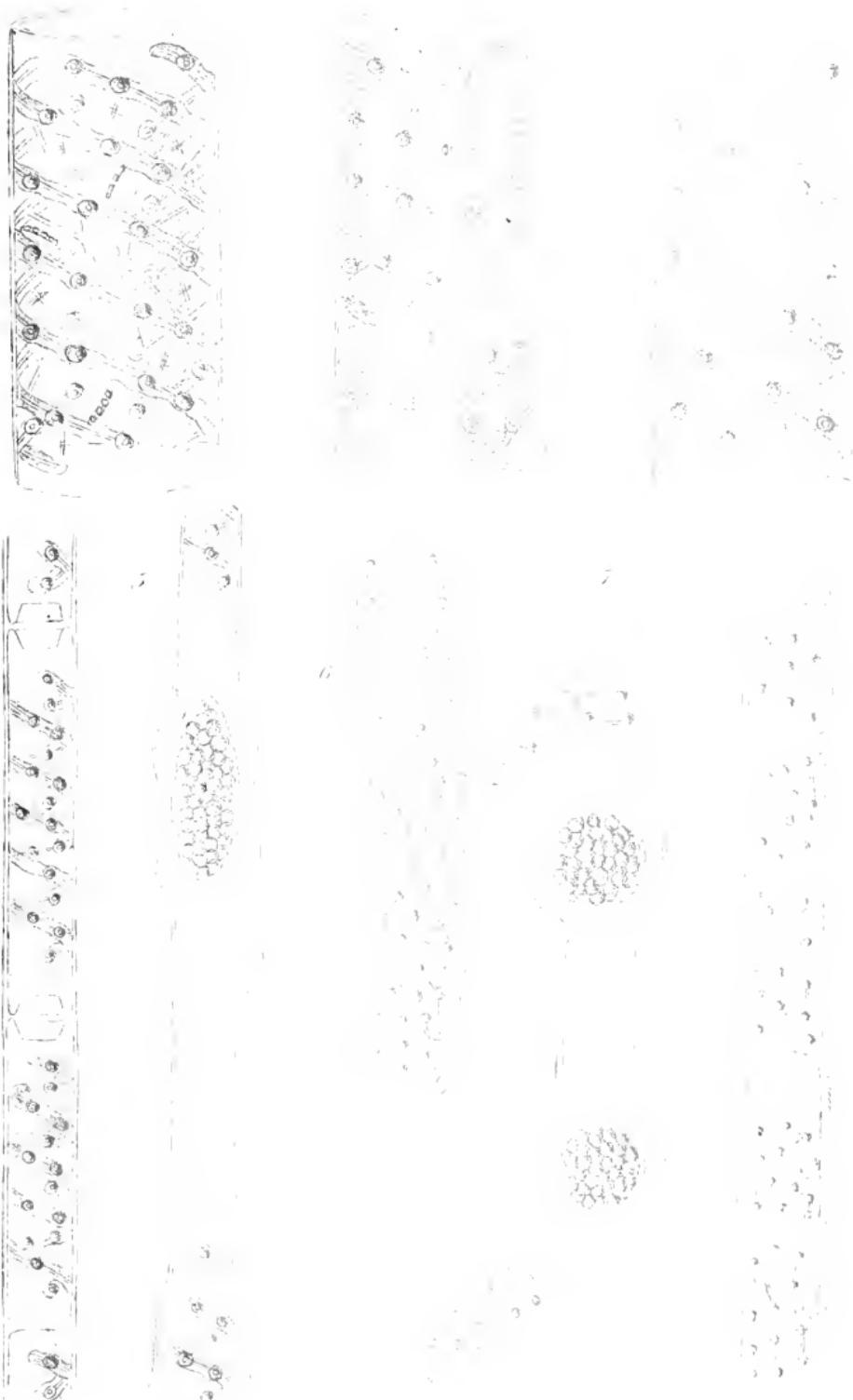


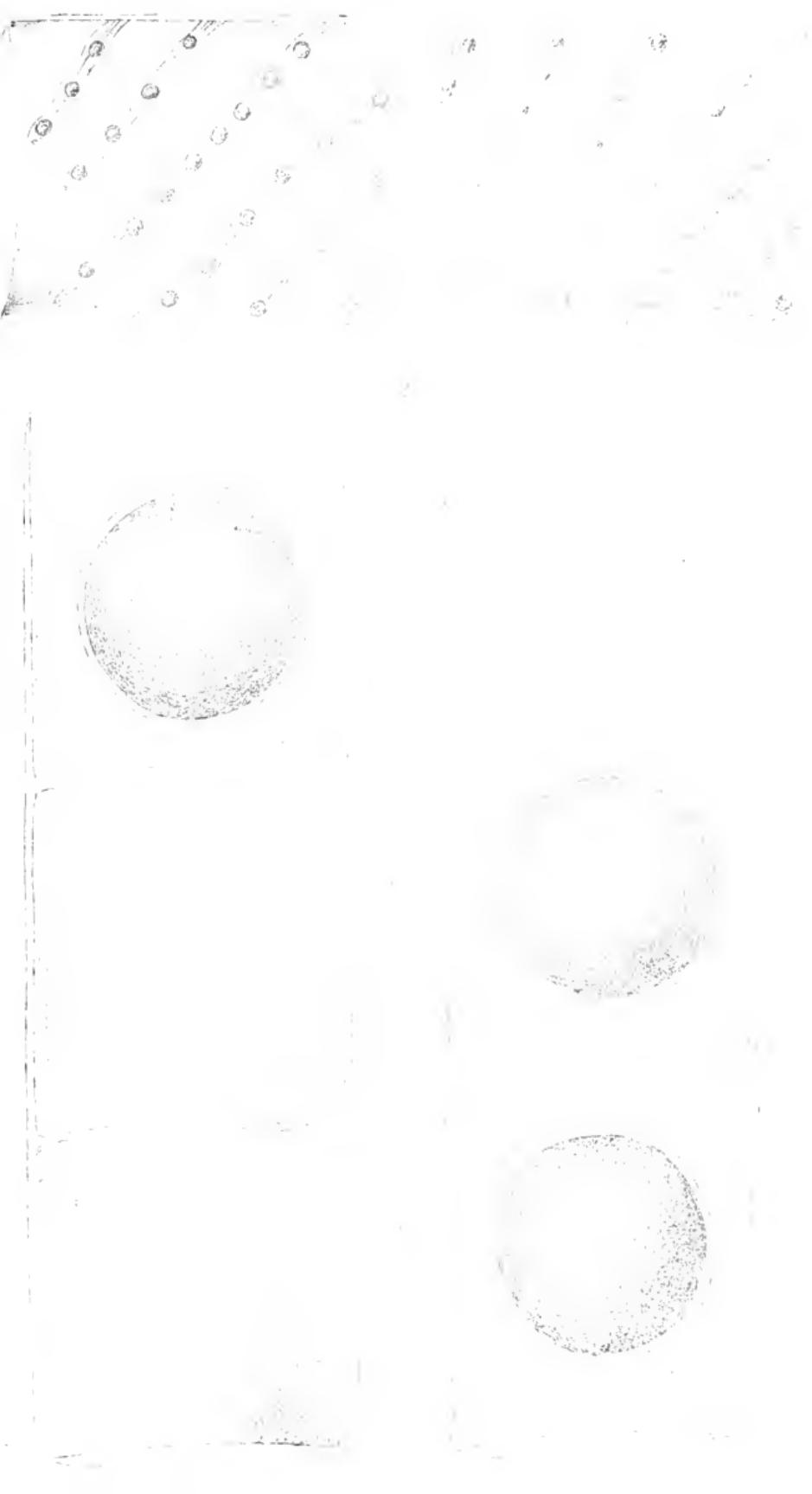


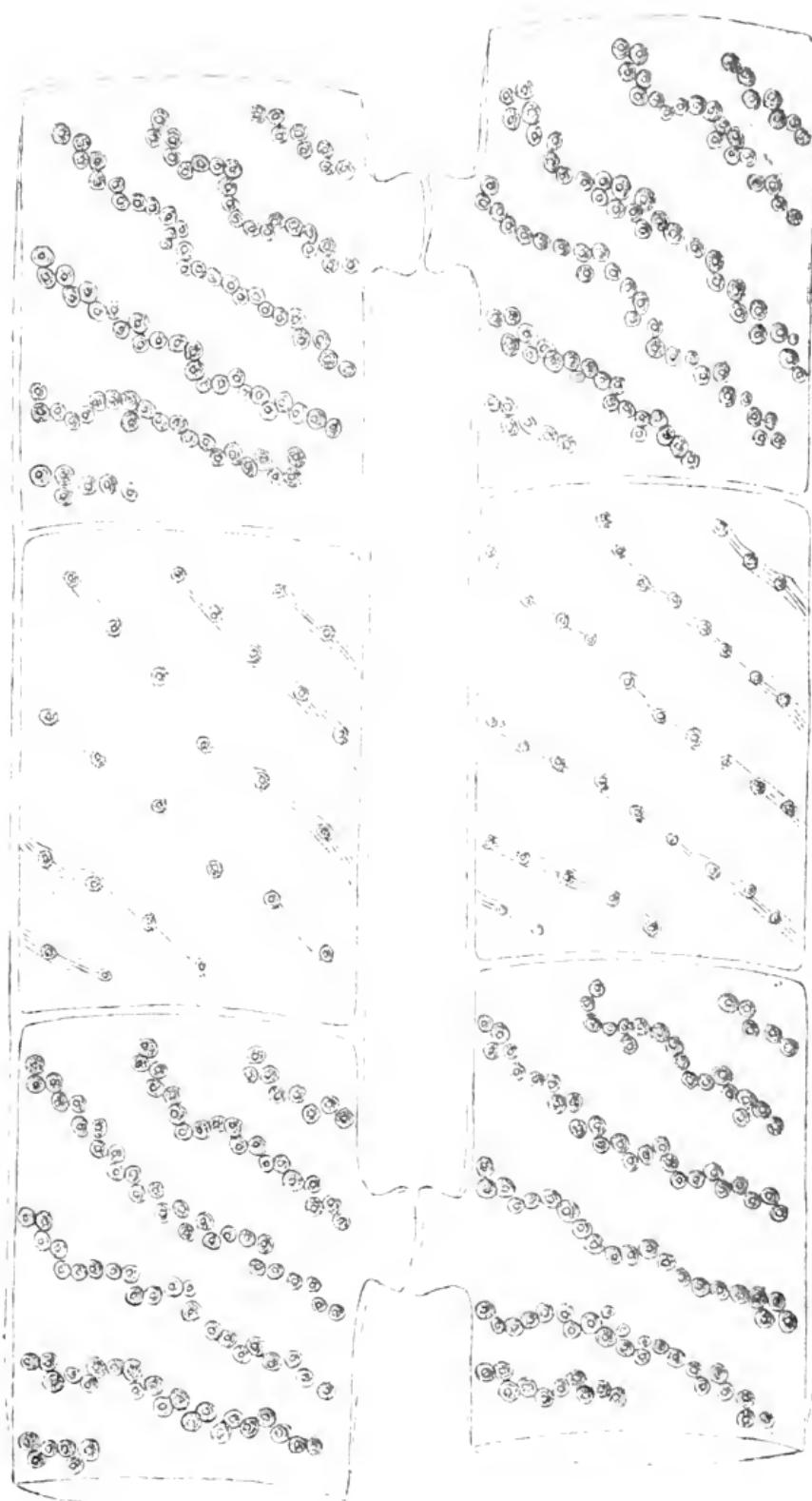
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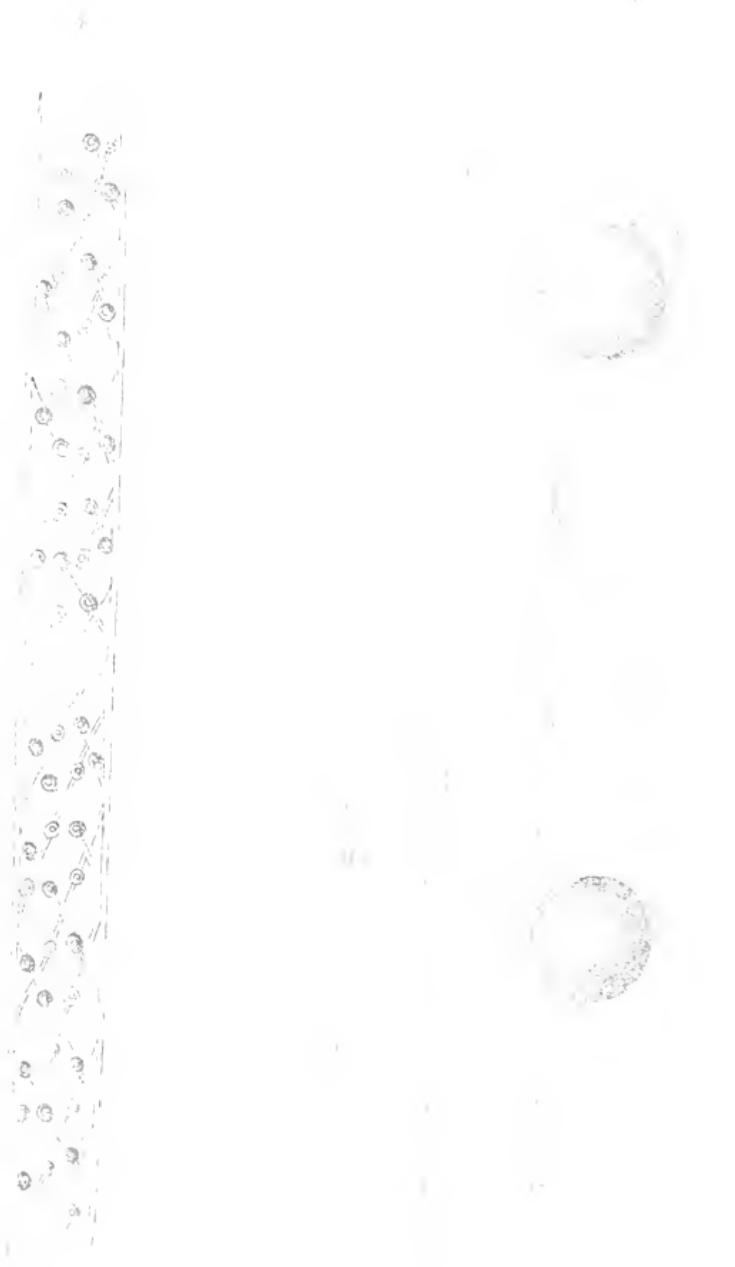


















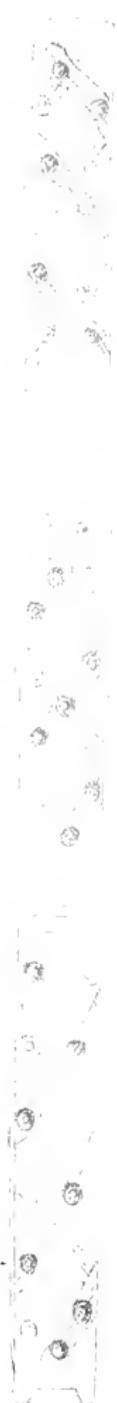


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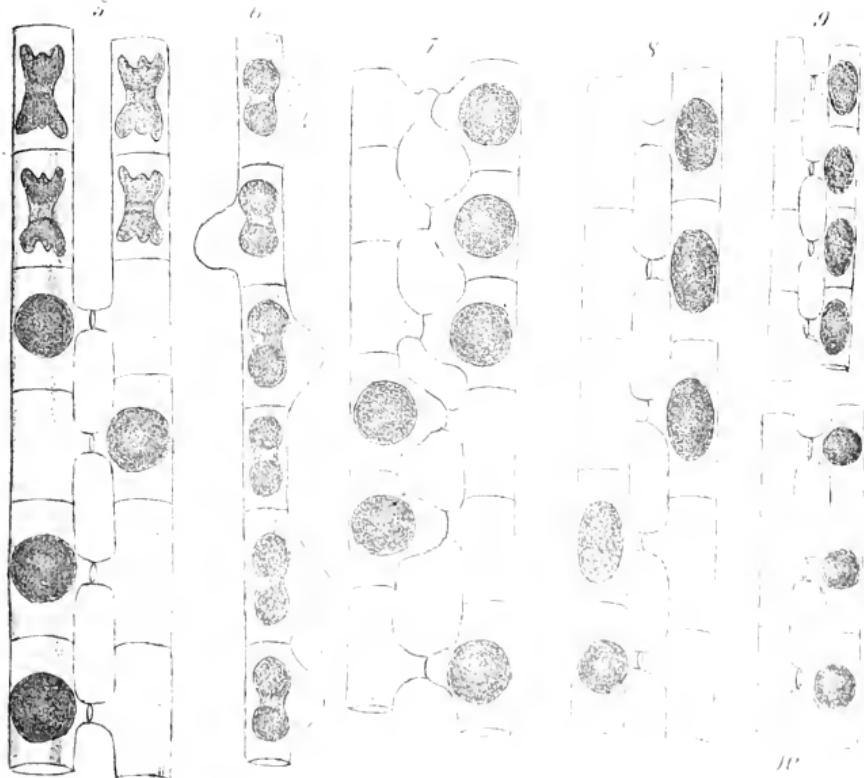
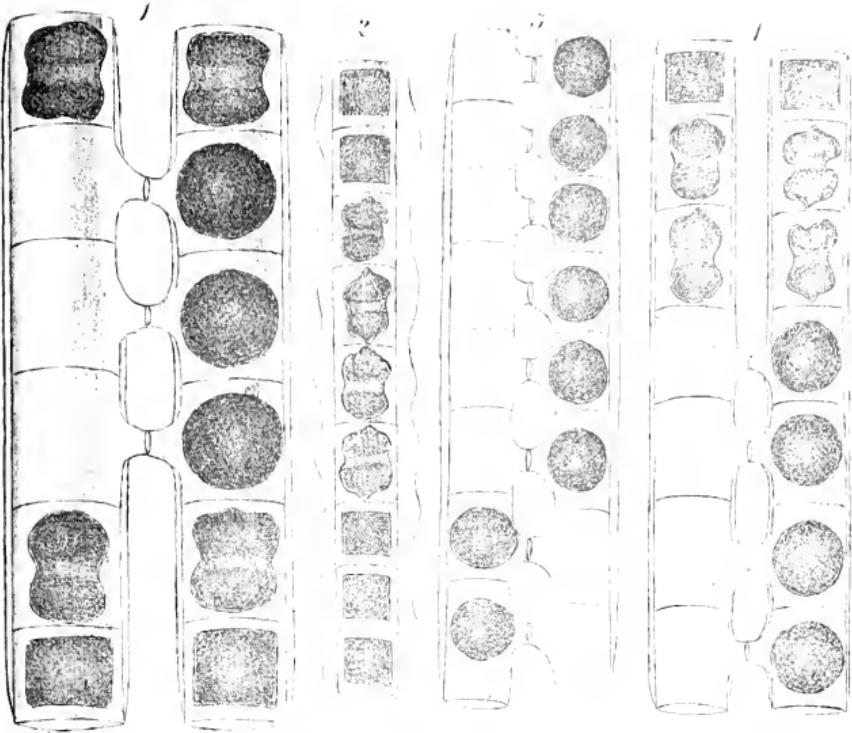


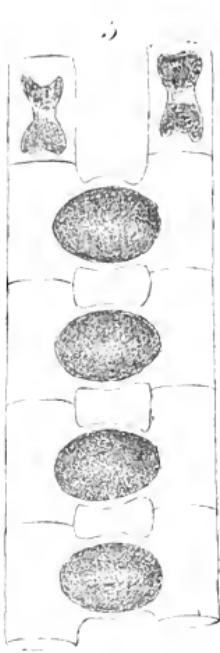
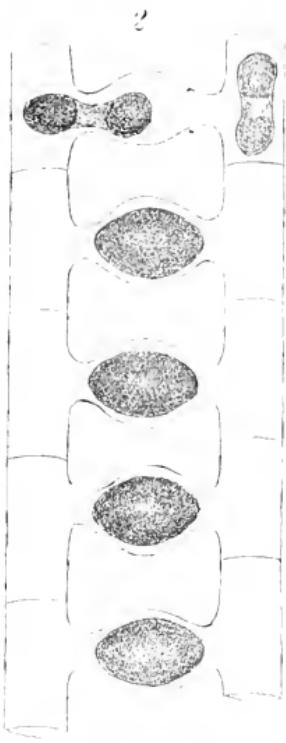










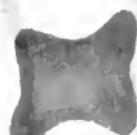
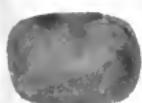






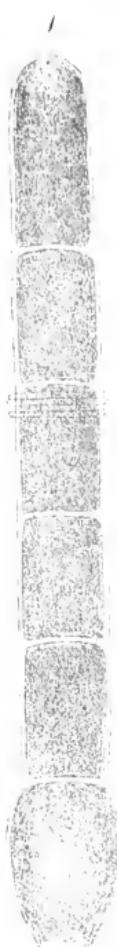




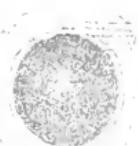




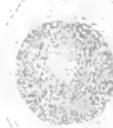
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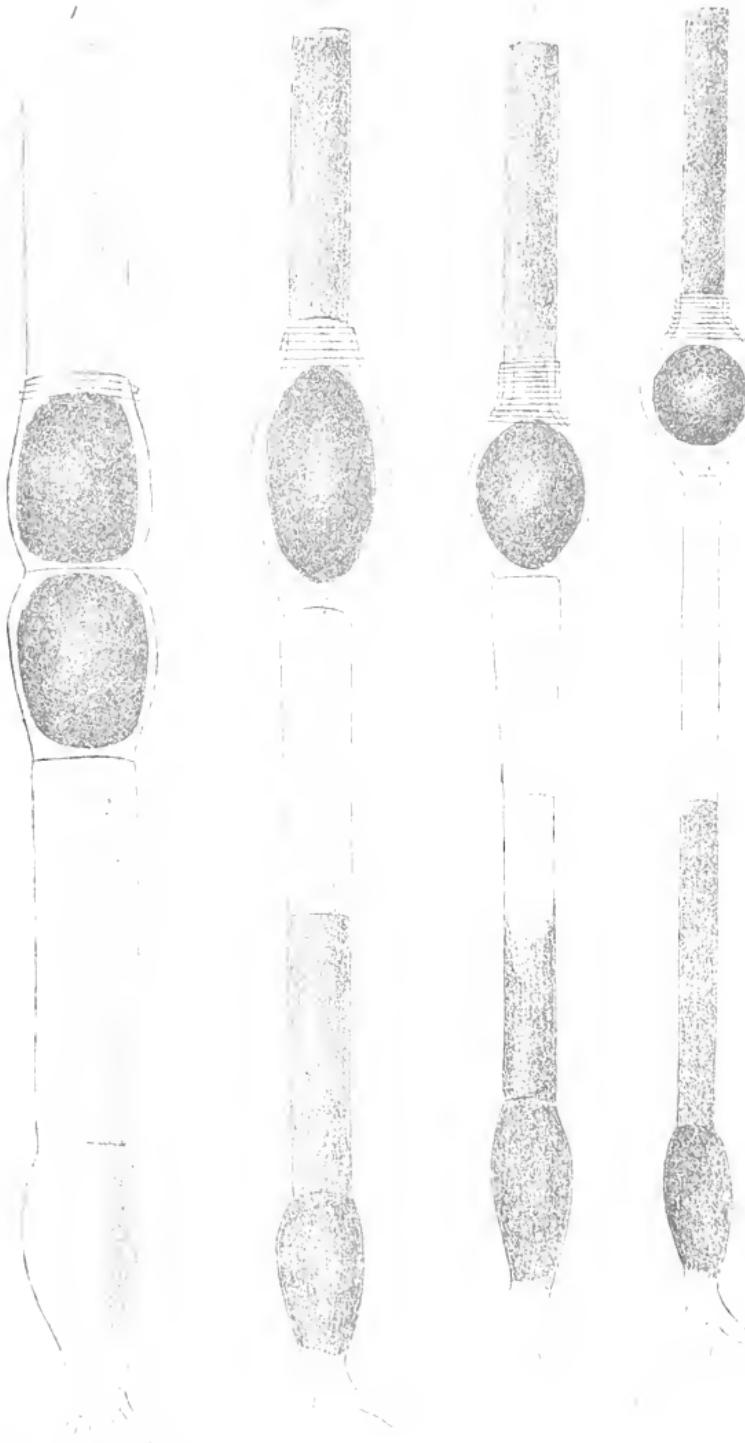


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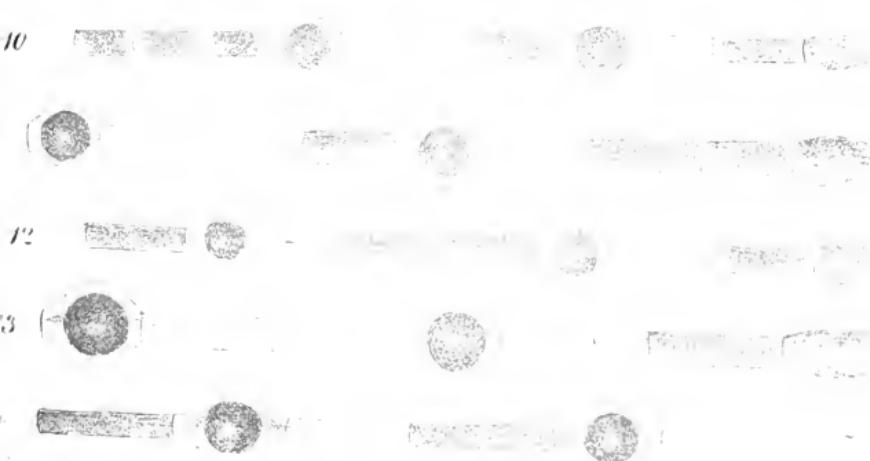
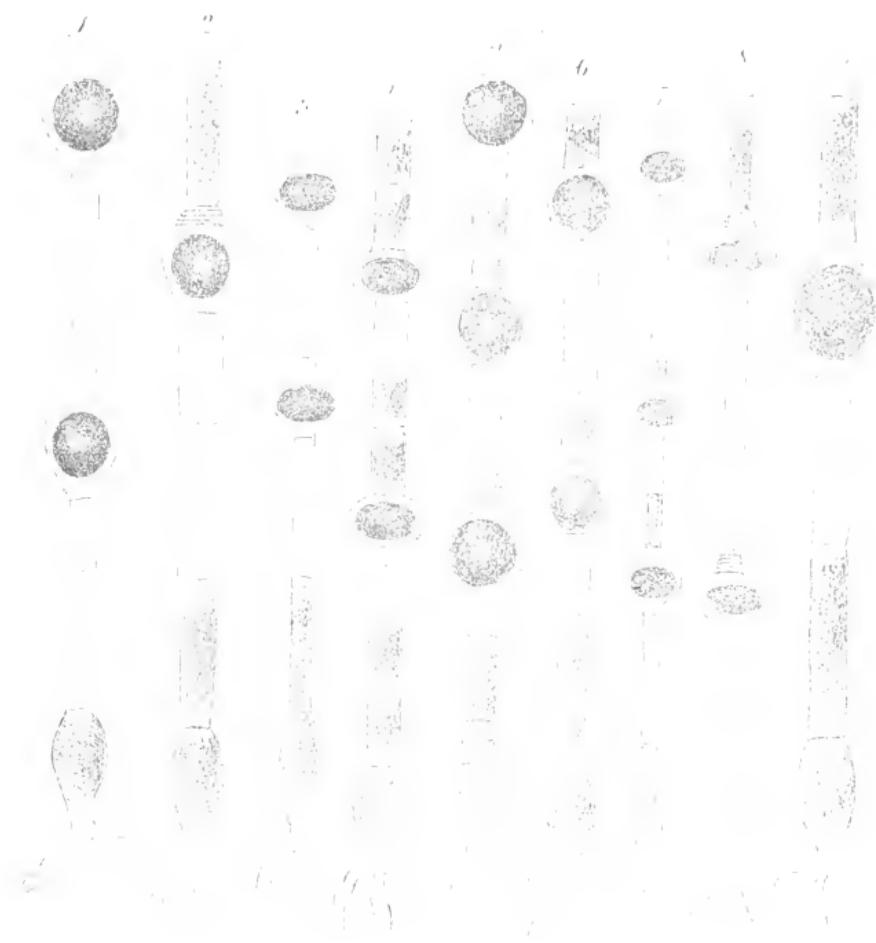


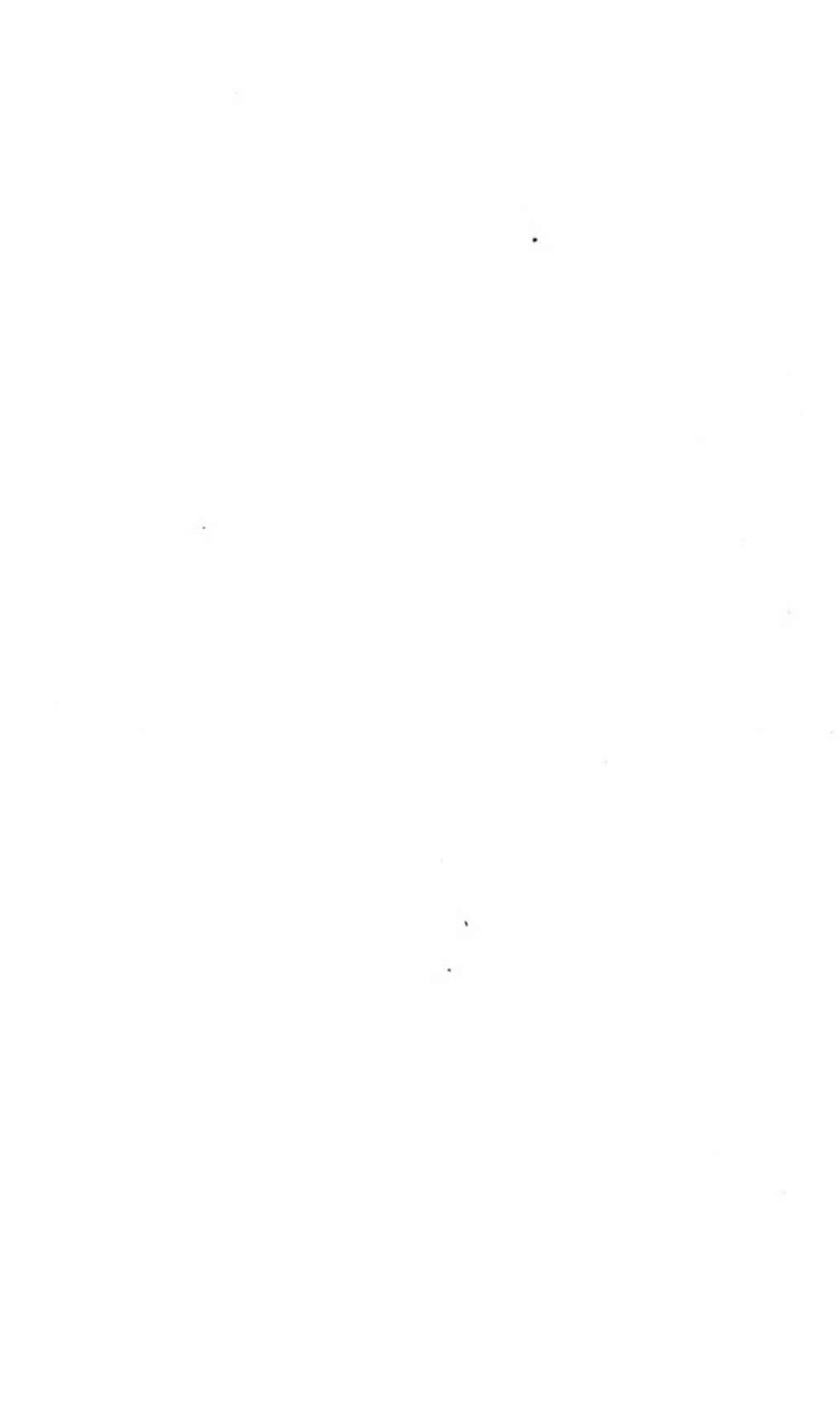
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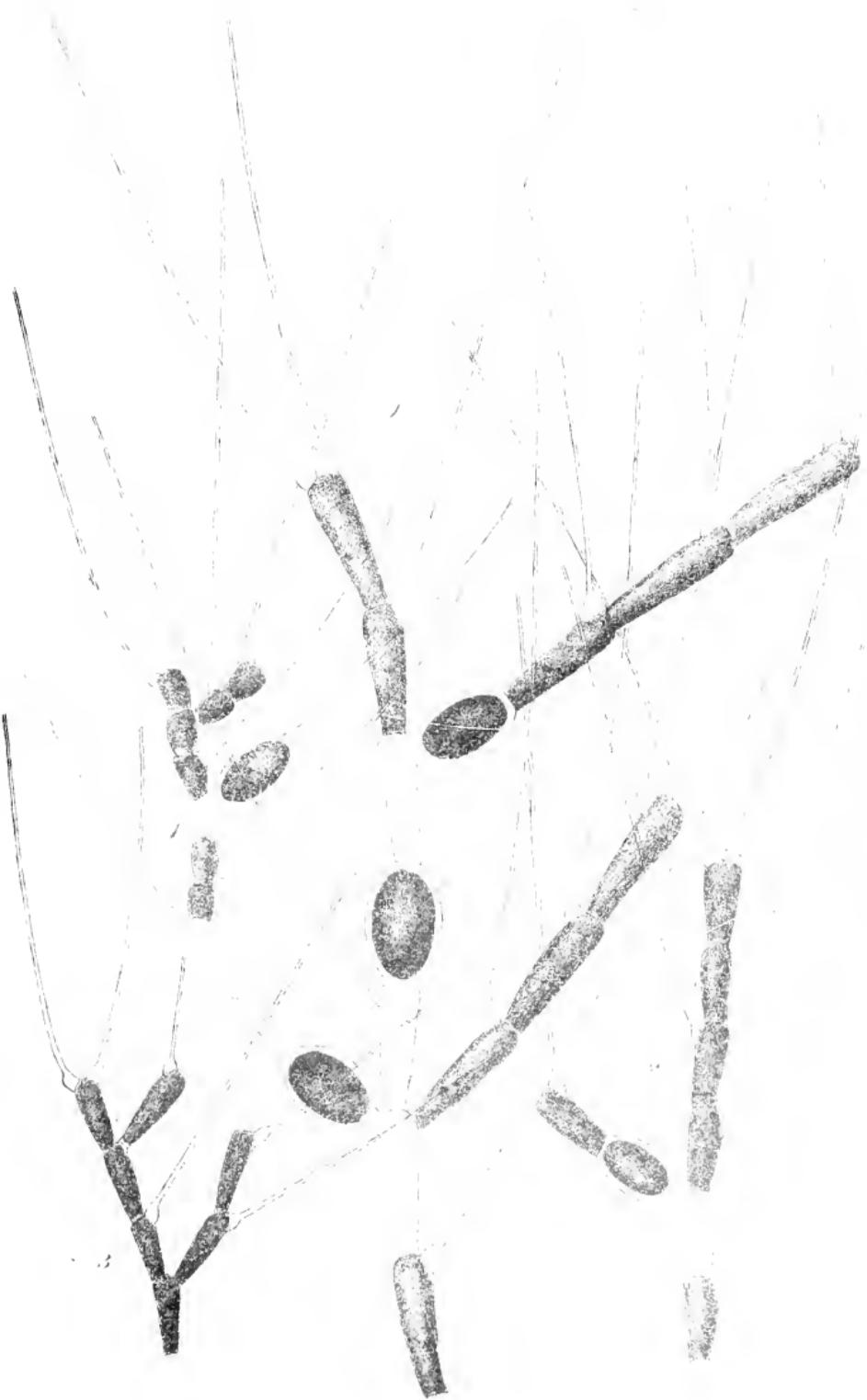










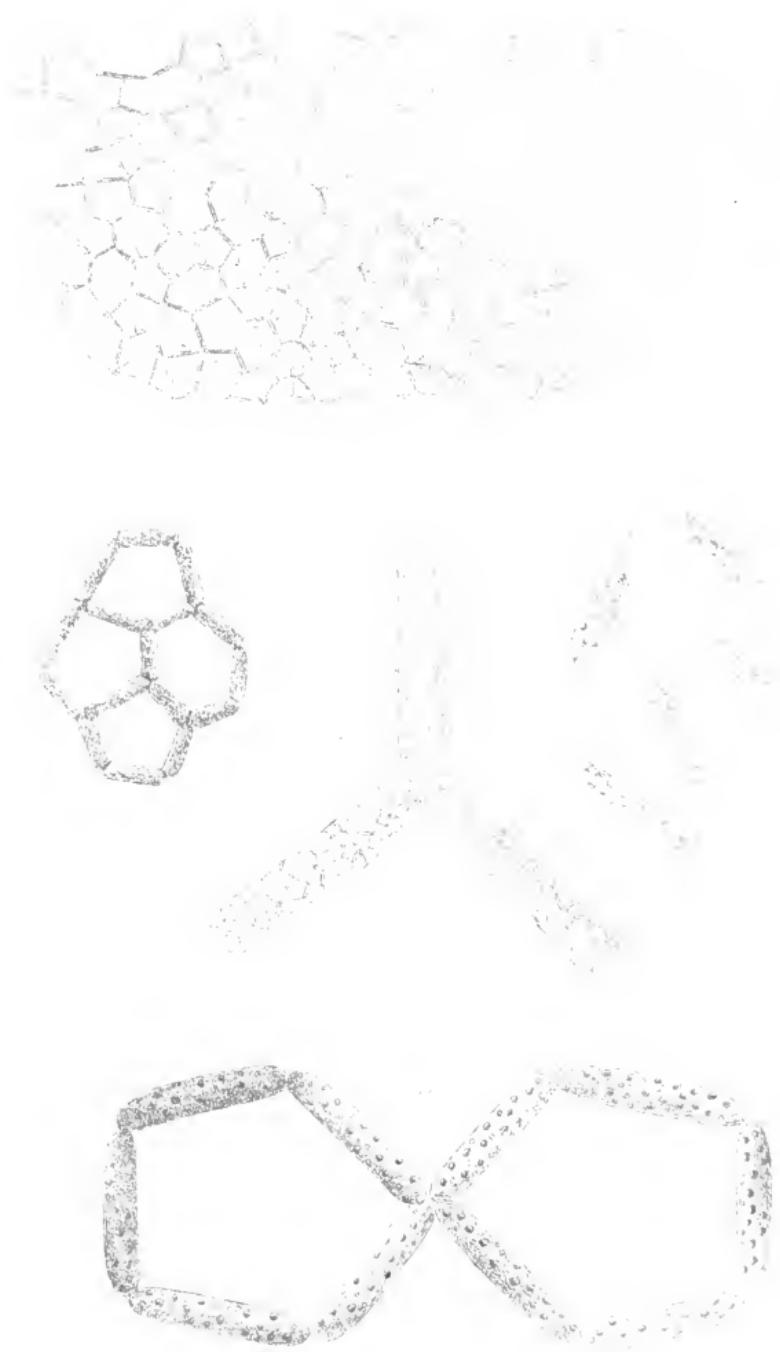
















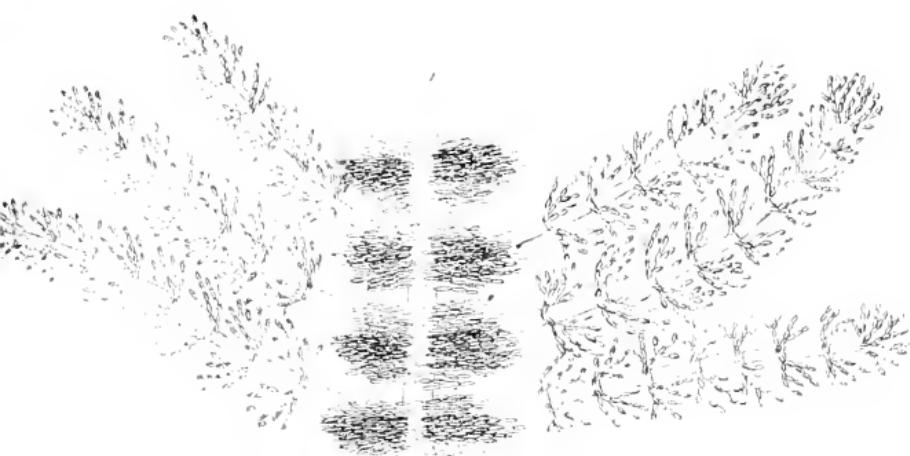






Fig. 147. *Sphenophyllum* sp. (Sphenophyllaceae).
A. Reconstruction of a portion of the stem showing the arrangement of the pinnae and the sporangia.

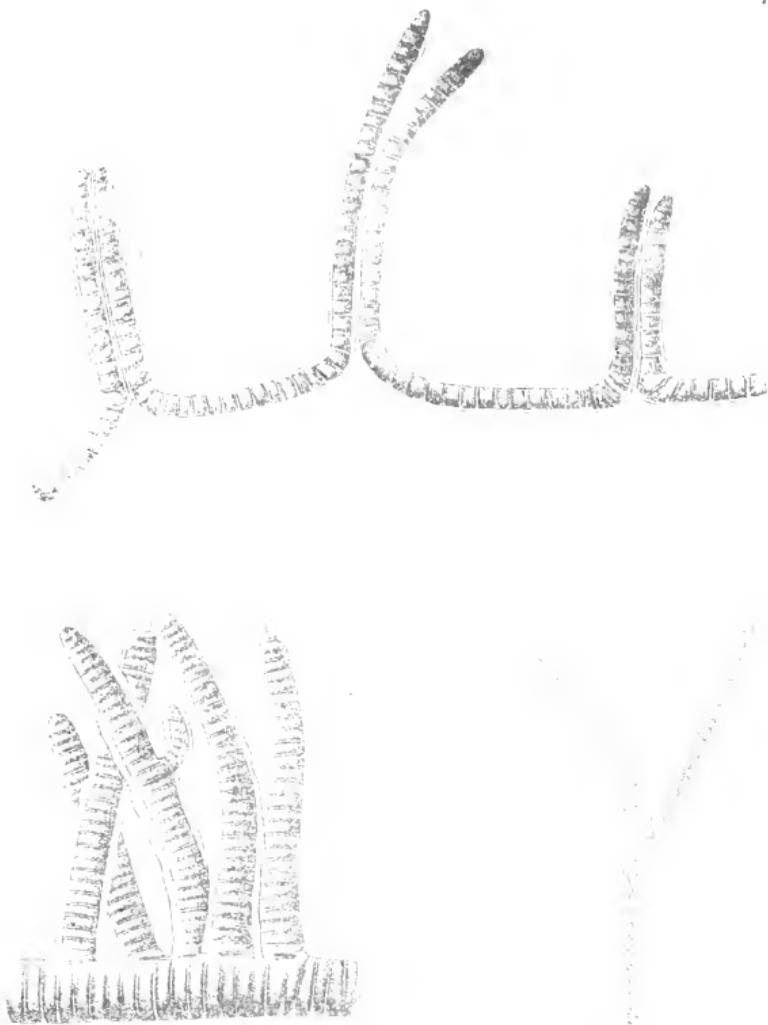


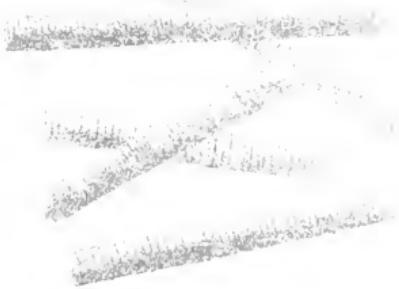
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1. *My right eye* is red and swollen.
2. *My right eye* is red and swollen.
3. *My right eye* is red and swollen.

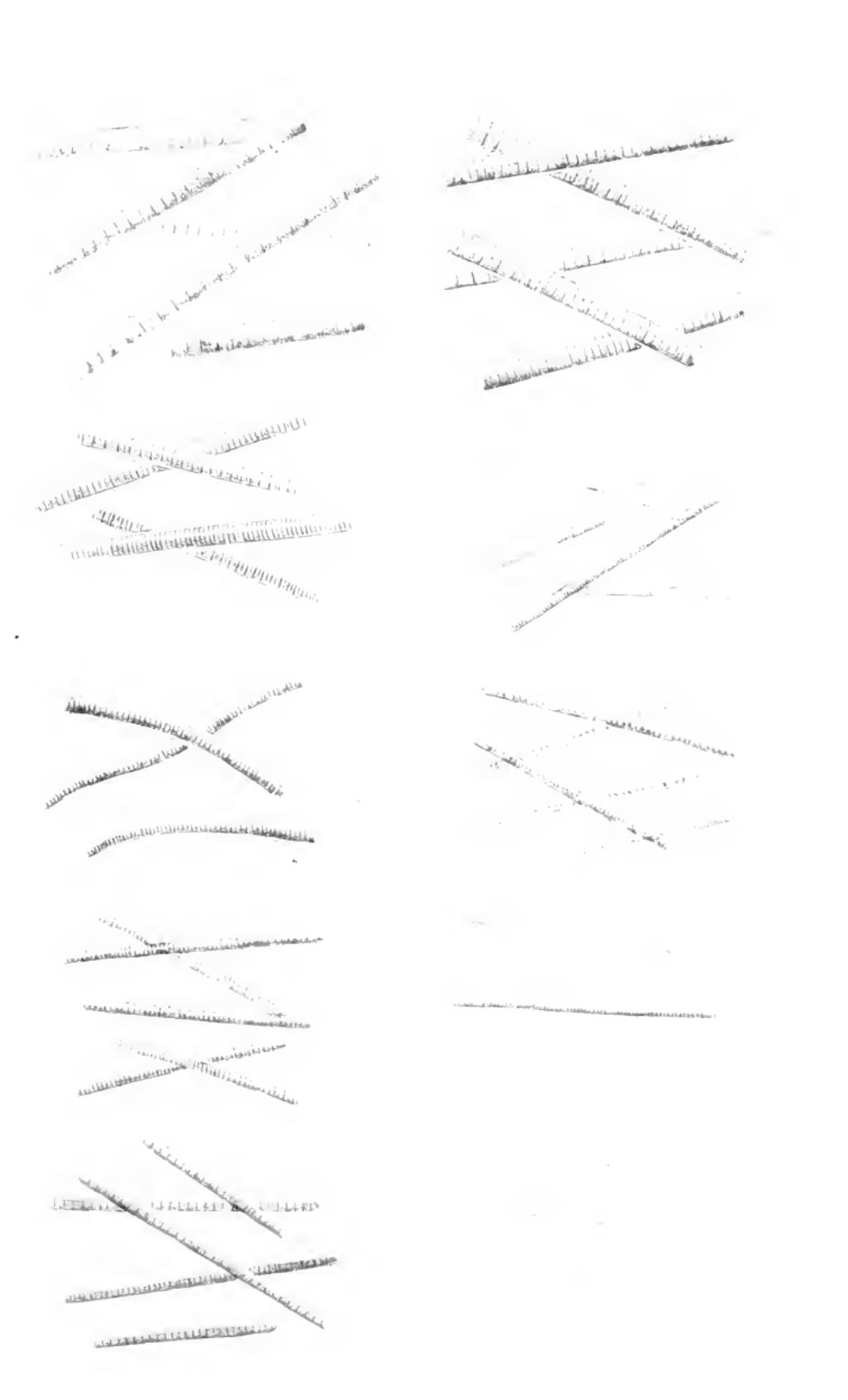
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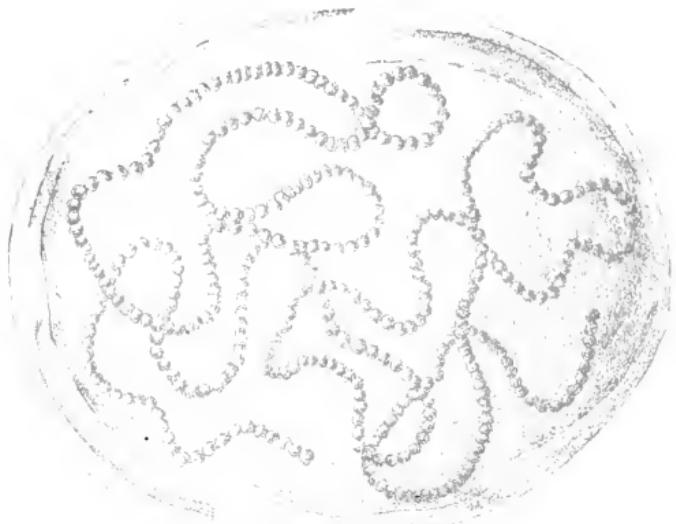


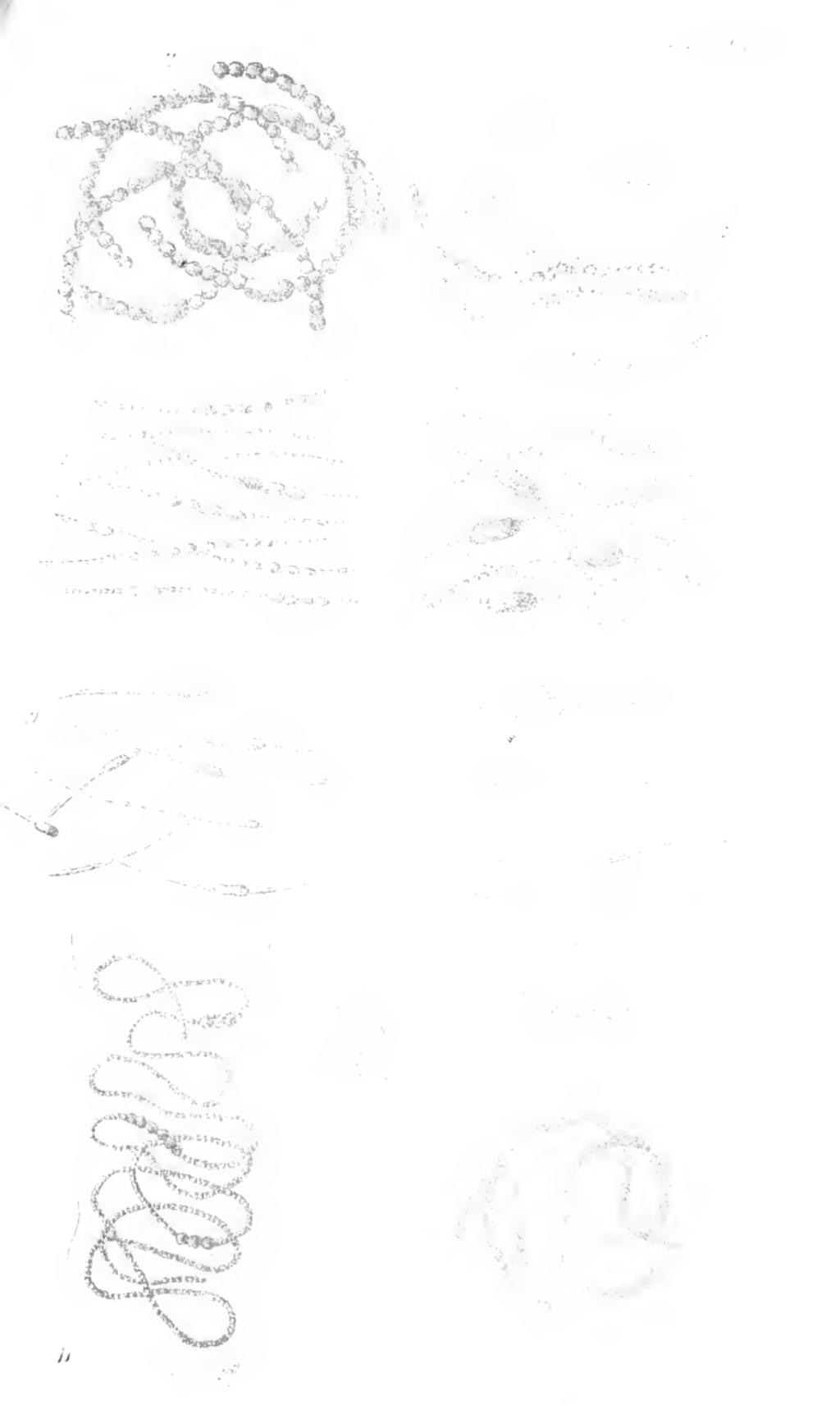
Calamaria) *Calamaria*



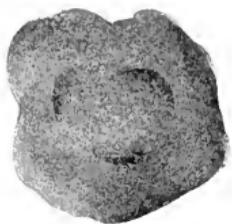
Calamaria

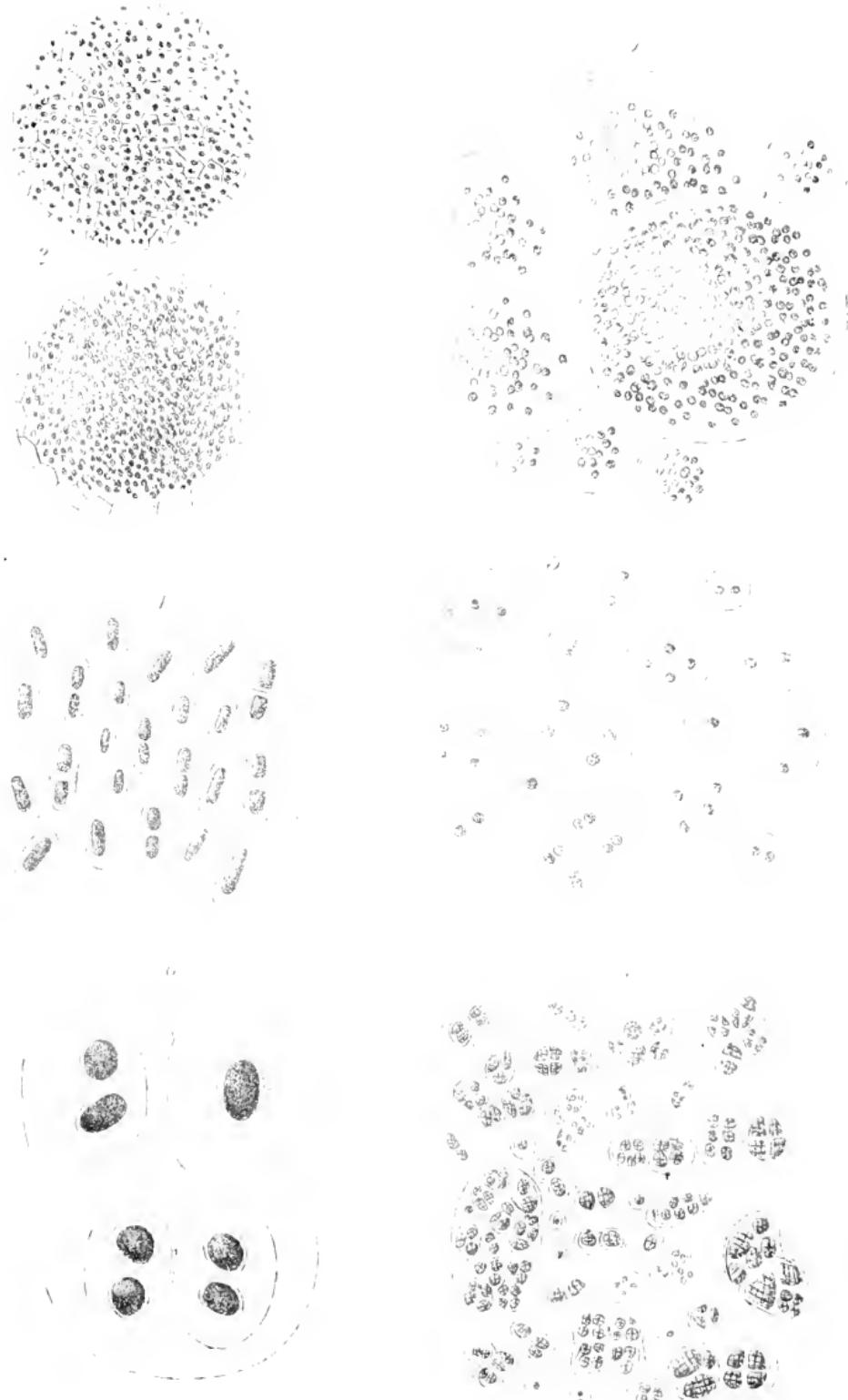
Verticillata and *hispida*

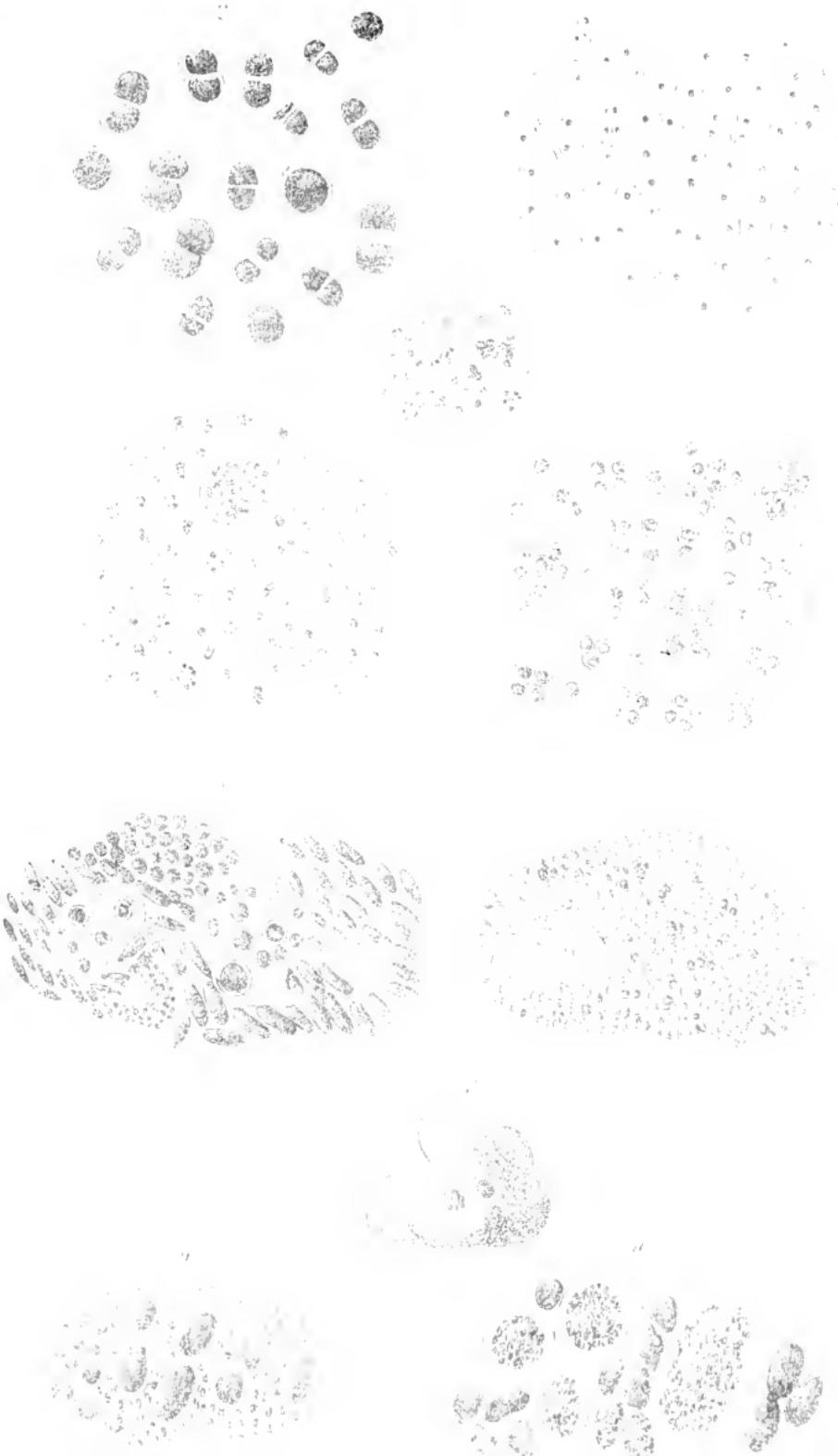












1.4. $\mathcal{L} = \mathcal{L}_1 \cup \mathcal{L}_2 \cup \mathcal{L}_3$

1.5. $\mathcal{L}_1 = \{ \mathcal{L}_1^{(1)}, \mathcal{L}_1^{(2)}, \dots, \mathcal{L}_1^{(n_1)} \}$

1.6. $\mathcal{L}_2 = \{ \mathcal{L}_2^{(1)}, \mathcal{L}_2^{(2)}, \dots, \mathcal{L}_2^{(n_2)} \}$

1.7. $\mathcal{L}_3 = \{ \mathcal{L}_3^{(1)}, \mathcal{L}_3^{(2)}, \dots, \mathcal{L}_3^{(n_3)} \}$

1.8. $\mathcal{L}_1^{(1)} = \{ \mathcal{L}_1^{(1,1)}, \mathcal{L}_1^{(1,2)}, \dots, \mathcal{L}_1^{(1,n_1)} \}$

1.9. $\mathcal{L}_1^{(2)} = \{ \mathcal{L}_1^{(2,1)}, \mathcal{L}_1^{(2,2)}, \dots, \mathcal{L}_1^{(2,n_1)} \}$

1.10. $\mathcal{L}_1^{(n_1)} = \{ \mathcal{L}_1^{(n_1,1)}, \mathcal{L}_1^{(n_1,2)}, \dots, \mathcal{L}_1^{(n_1,n_1)} \}$

1.11. $\mathcal{L}_2^{(1)} = \{ \mathcal{L}_2^{(1,1)}, \mathcal{L}_2^{(1,2)}, \dots, \mathcal{L}_2^{(1,n_2)} \}$

1.12. $\mathcal{L}_2^{(2)} = \{ \mathcal{L}_2^{(2,1)}, \mathcal{L}_2^{(2,2)}, \dots, \mathcal{L}_2^{(2,n_2)} \}$

1.13. $\mathcal{L}_2^{(n_2)} = \{ \mathcal{L}_2^{(n_2,1)}, \mathcal{L}_2^{(n_2,2)}, \dots, \mathcal{L}_2^{(n_2,n_2)} \}$

1.14. $\mathcal{L}_3^{(1)} = \{ \mathcal{L}_3^{(1,1)}, \mathcal{L}_3^{(1,2)}, \dots, \mathcal{L}_3^{(1,n_3)} \}$

1.15. $\mathcal{L}_3^{(2)} = \{ \mathcal{L}_3^{(2,1)}, \mathcal{L}_3^{(2,2)}, \dots, \mathcal{L}_3^{(2,n_3)} \}$

1.16. $\mathcal{L}_3^{(n_3)} = \{ \mathcal{L}_3^{(n_3,1)}, \mathcal{L}_3^{(n_3,2)}, \dots, \mathcal{L}_3^{(n_3,n_3)} \}$

1.17. $\mathcal{L}_1^{(1,1)} = \{ \mathcal{L}_1^{(1,1,1)}, \mathcal{L}_1^{(1,1,2)}, \dots, \mathcal{L}_1^{(1,1,n_1)} \}$

1.18. $\mathcal{L}_1^{(1,2)} = \{ \mathcal{L}_1^{(1,2,1)}, \mathcal{L}_1^{(1,2,2)}, \dots, \mathcal{L}_1^{(1,2,n_1)} \}$

1.19. $\mathcal{L}_1^{(1,n_1)} = \{ \mathcal{L}_1^{(1,n_1,1)}, \mathcal{L}_1^{(1,n_1,2)}, \dots, \mathcal{L}_1^{(1,n_1,n_1)} \}$

1.20. $\mathcal{L}_1^{(2,1)} = \{ \mathcal{L}_1^{(2,1,1)}, \mathcal{L}_1^{(2,1,2)}, \dots, \mathcal{L}_1^{(2,1,n_1)} \}$

1.21. $\mathcal{L}_1^{(2,2)} = \{ \mathcal{L}_1^{(2,2,1)}, \mathcal{L}_1^{(2,2,2)}, \dots, \mathcal{L}_1^{(2,2,n_1)} \}$

1.22. $\mathcal{L}_1^{(2,n_1)} = \{ \mathcal{L}_1^{(2,n_1,1)}, \mathcal{L}_1^{(2,n_1,2)}, \dots, \mathcal{L}_1^{(2,n_1,n_1)} \}$

1.23. $\mathcal{L}_1^{(n_1,1)} = \{ \mathcal{L}_1^{(n_1,1,1)}, \mathcal{L}_1^{(n_1,1,2)}, \dots, \mathcal{L}_1^{(n_1,1,n_1)} \}$

1.24. $\mathcal{L}_1^{(n_1,2)} = \{ \mathcal{L}_1^{(n_1,2,1)}, \mathcal{L}_1^{(n_1,2,2)}, \dots, \mathcal{L}_1^{(n_1,2,n_1)} \}$

1.25. $\mathcal{L}_1^{(n_1,n_1)} = \{ \mathcal{L}_1^{(n_1,n_1,1)}, \mathcal{L}_1^{(n_1,n_1,2)}, \dots, \mathcal{L}_1^{(n_1,n_1,n_1)} \}$

1.26. $\mathcal{L}_2^{(1,1)} = \{ \mathcal{L}_2^{(1,1,1)}, \mathcal{L}_2^{(1,1,2)}, \dots, \mathcal{L}_2^{(1,1,n_2)} \}$

1.27. $\mathcal{L}_2^{(1,2)} = \{ \mathcal{L}_2^{(1,2,1)}, \mathcal{L}_2^{(1,2,2)}, \dots, \mathcal{L}_2^{(1,2,n_2)} \}$

1.28. $\mathcal{L}_2^{(1,n_2)} = \{ \mathcal{L}_2^{(1,n_2,1)}, \mathcal{L}_2^{(1,n_2,2)}, \dots, \mathcal{L}_2^{(1,n_2,n_2)} \}$

1.29. $\mathcal{L}_2^{(2,1)} = \{ \mathcal{L}_2^{(2,1,1)}, \mathcal{L}_2^{(2,1,2)}, \dots, \mathcal{L}_2^{(2,1,n_2)} \}$

1.30. $\mathcal{L}_2^{(2,2)} = \{ \mathcal{L}_2^{(2,2,1)}, \mathcal{L}_2^{(2,2,2)}, \dots, \mathcal{L}_2^{(2,2,n_2)} \}$

1.31. $\mathcal{L}_2^{(2,n_2)} = \{ \mathcal{L}_2^{(2,n_2,1)}, \mathcal{L}_2^{(2,n_2,2)}, \dots, \mathcal{L}_2^{(2,n_2,n_2)} \}$

1.32. $\mathcal{L}_3^{(1,1)} = \{ \mathcal{L}_3^{(1,1,1)}, \mathcal{L}_3^{(1,1,2)}, \dots, \mathcal{L}_3^{(1,1,n_3)} \}$

1.33. $\mathcal{L}_3^{(1,2)} = \{ \mathcal{L}_3^{(1,2,1)}, \mathcal{L}_3^{(1,2,2)}, \dots, \mathcal{L}_3^{(1,2,n_3)} \}$

1.34. $\mathcal{L}_3^{(1,n_3)} = \{ \mathcal{L}_3^{(1,n_3,1)}, \mathcal{L}_3^{(1,n_3,2)}, \dots, \mathcal{L}_3^{(1,n_3,n_3)} \}$

1.35. $\mathcal{L}_3^{(2,1)} = \{ \mathcal{L}_3^{(2,1,1)}, \mathcal{L}_3^{(2,1,2)}, \dots, \mathcal{L}_3^{(2,1,n_3)} \}$

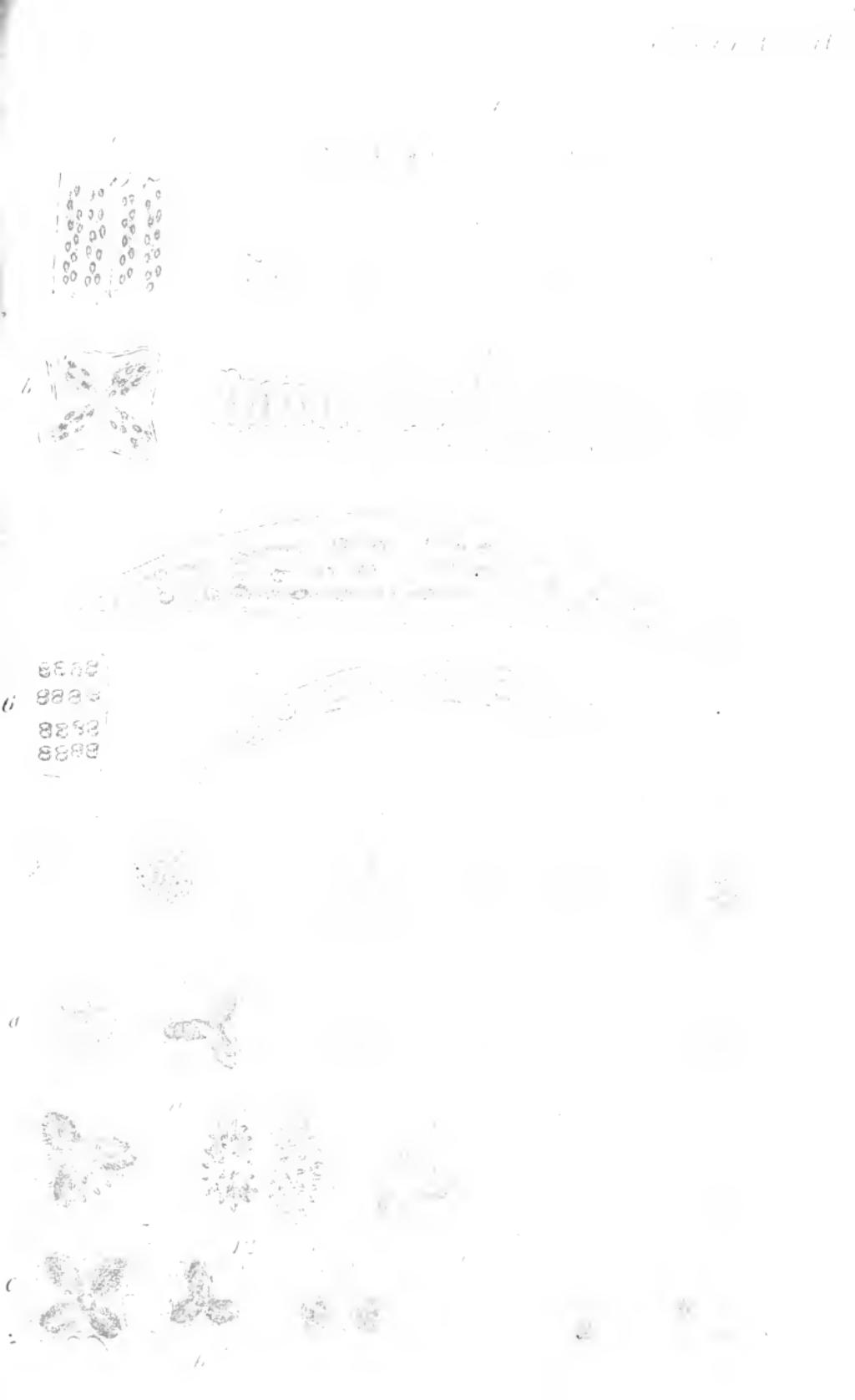
1.36. $\mathcal{L}_3^{(2,2)} = \{ \mathcal{L}_3^{(2,2,1)}, \mathcal{L}_3^{(2,2,2)}, \dots, \mathcal{L}_3^{(2,2,n_3)} \}$

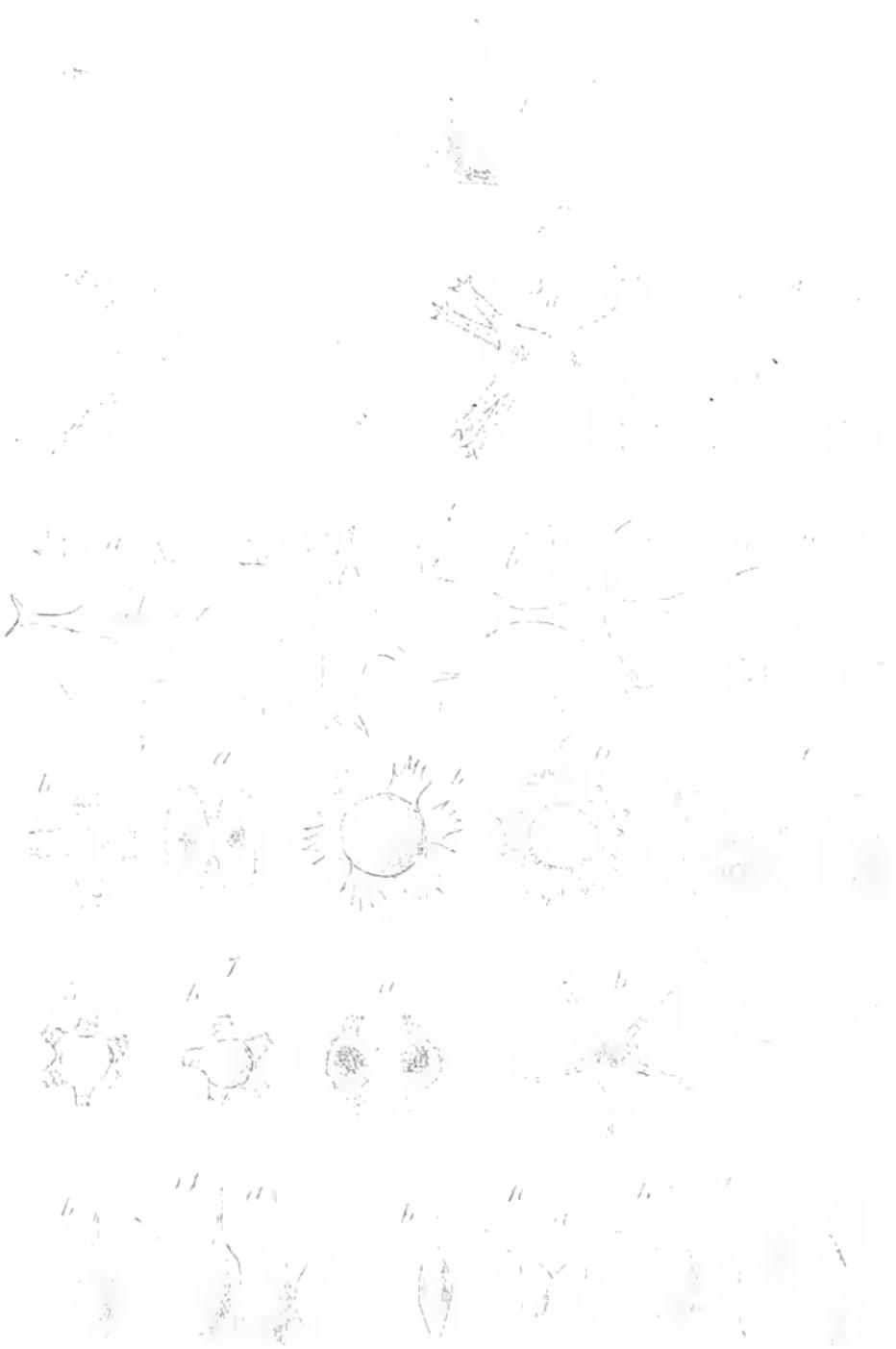
1.37. $\mathcal{L}_3^{(2,n_3)} = \{ \mathcal{L}_3^{(2,n_3,1)}, \mathcal{L}_3^{(2,n_3,2)}, \dots, \mathcal{L}_3^{(2,n_3,n_3)} \}$

1.38. $\mathcal{L}_3^{(n_3,1)} = \{ \mathcal{L}_3^{(n_3,1,1)}, \mathcal{L}_3^{(n_3,1,2)}, \dots, \mathcal{L}_3^{(n_3,1,n_3)} \}$

1.39. $\mathcal{L}_3^{(n_3,2)} = \{ \mathcal{L}_3^{(n_3,2,1)}, \mathcal{L}_3^{(n_3,2,2)}, \dots, \mathcal{L}_3^{(n_3,2,n_3)} \}$

1.40. $\mathcal{L}_3^{(n_3,n_3)} = \{ \mathcal{L}_3^{(n_3,n_3,1)}, \mathcal{L}_3^{(n_3,n_3,2)}, \dots, \mathcal{L}_3^{(n_3,n_3,n_3)} \}$







1964-7-17





14

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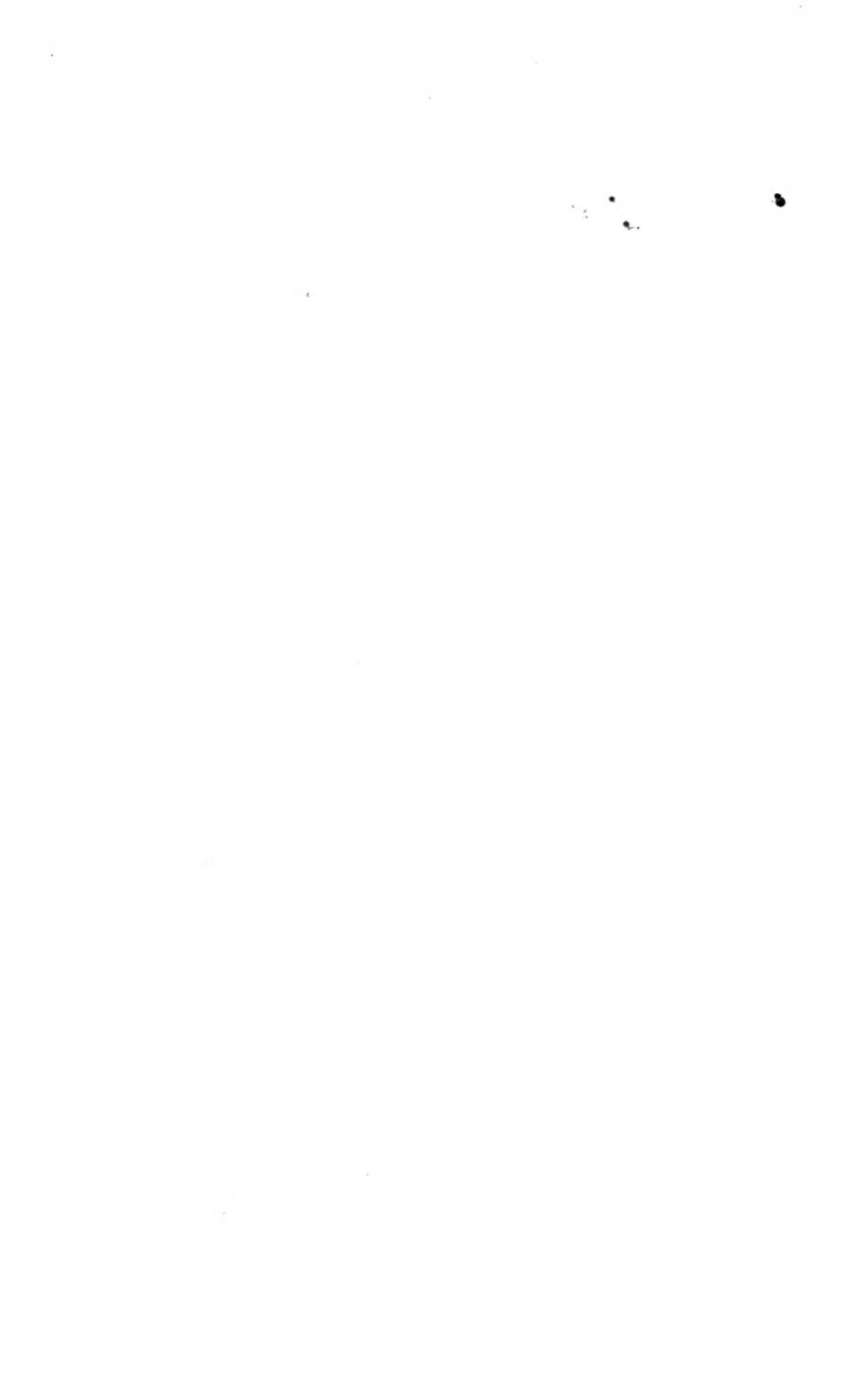


Plate 101

4

16

